Home/Office Electrical/Electronic Equipment servicing

Level III

Based on May, 2011 Version2 OS and Feb, 2021 Version Curriculum

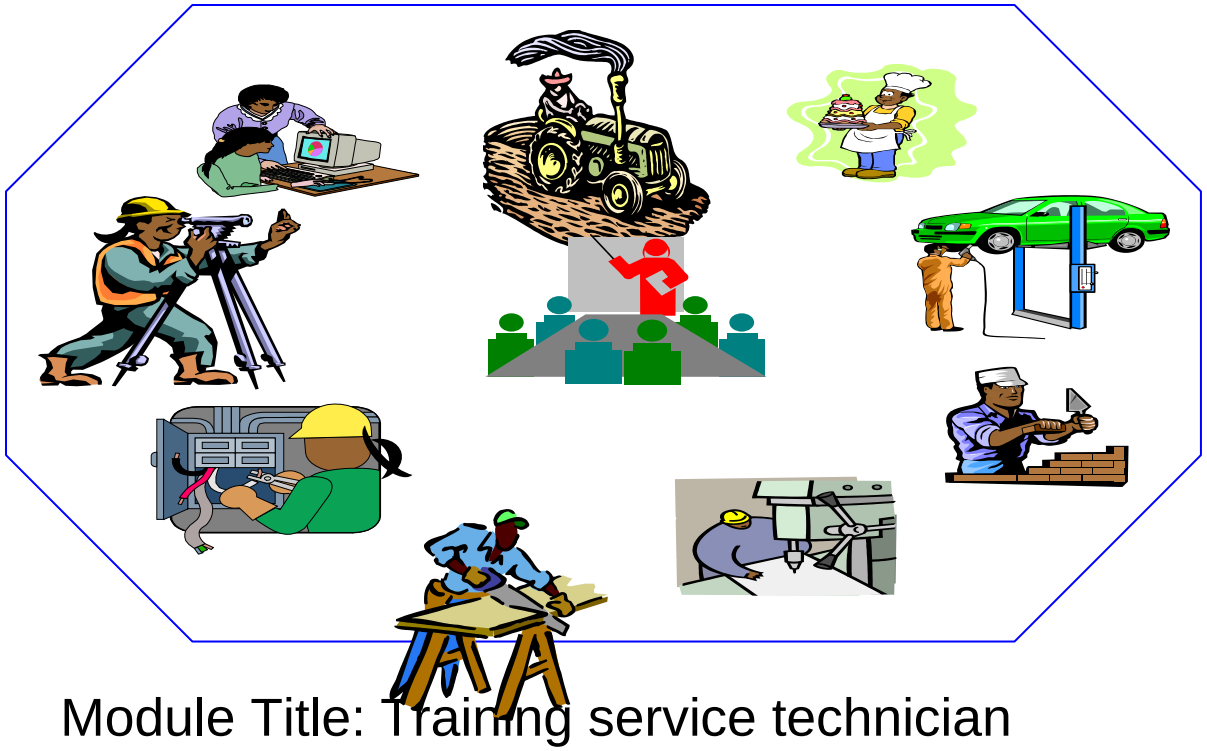

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Table of Contents page

L18 #	LO1: Plan and Prepare Training Activities

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- OHS requirements and safe working procedures
- Preparing required tools, materials and equipment in the works
- Determining Stage of development
- Preparing for particular training includes activities
- understanding of the training activity to performs

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- OHS requirements and safe working procedures
- Prepares required tools, materials and equipment in the works
- Determines Stage of development
- Prepares for particular training includes activities
- understand of the training activity to performs

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
4. Accomplish the “Self-checks” which are placed following all information sheets.
5. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).
6. If you earned a satisfactory evaluation proceed to “Operation sheets
7. Perform “the Learning activity performance test” which is placed following “Operation sheets” ,
8. If your performance is satisfactory proceed to the next learning guide,
9. If your performance is unsatisfactory, see your trainer for further instructions or go back to “Operation sheets”.

Information Sheet#1	Safety procedures for technician

OVERVIEW

This guide deals with the precautions, safety and health issues of the working personnel in the various kinds of industries. We can get the knowledge about the basic safety measures while working for small scale, medium scale or large scale industries. Some standard guidelines are provided in this book. Electrical, mechanical, electromagnetic radiations in the form of hazards are discussed precisely and the proper safety precautions are elaborated. That will be the guiding light for human being to minimize the accidents and possible health care.

Occupational health and safety is of key importance for working industry to safeguard interests of working personnel. It is of prime importance for a personnel working in hazardous environment, to make their life always secure and safe. It adapts working environment to workers for the promotion and maintenance of their physical, mental and social wellbeing for workers in all occupations. The question of occupational health and safety is a global issue and is now taking a new turn with most countries having safety department an essential part of their work culture.

This is largely due to the industrial and agricultural outgrowth and development in the developing countries and the emergence of new products and product processes from these occupational health and safety places. Many of these countries are shifting from manual labor to automated or machine-operated in the main productive sectors, such as manufacturing, mining engineering and agriculture. Hence, it can affect the potential occupational health.

OCCUPATIONAL SAFETY AND HEALTH

Safety is defined as the protection from harm, danger, risk, accident or injury. It is very necessaryin usual lives to follow the safety rules and regulation at all the works. Almost all the accidents usually occur due to lack of safety. Therefore safety is the most important in any industrial or occupational setup.

Need of occupational health and safety:

- We have to ensure in all business about the care of workers and all the persons involved in business for good health all the time.
- It provides employees lives and health.
- Occupational safety and health rules can decrease worker injury and illness.

Occupational Health

It is concerned with the identification and control of the danger arising due to physical, chemical and other work places hazards to maintain a healthy working environment. The hazards may cause due to chemical agent, heavy metals, physical agents, electricity, dangerous machinery etc. The prime goal of existence of man power inside industry to get maximum output from their mental and physical health. Therefore the health of work force must be considered on the top of management agenda. To ensure their healthy life they must have a proper and concrete planning. Some of the factors to be considered while planning for their health issues are listed below:

- Standard working hours
- Weekly / medical / casual leave
- Hygienic canteen facility for meal
- Pure drinking water
- Rest room
- Hygienic wash room
- Ambulance facility

Occupational Hygiene

It is the discipline of anticipating, recognizing, evaluating and controlling health hazards in the working environments with the objective of protective worker health, well-being and safe guarding the community at large.

Anticipation: The identification of hazards and its associated effects on the health is called anticipation.

Recognition: It is the process to establish hazardous place or agent at the work place.

Evaluation: It is the measure of hazards which can be evaluated with the help of some tools or technique.

Self-Check -1	**Written Test**

Say True if the statement is correct and false if the statement is incorrect

1. A first critical step in developing a comprehensive safety and health program is known as a “hazard assessment.”
2. Overexposure to chemicals or radiation is a physical hazard.
3. Fluctuating temperatures and pinching objects are examples of health hazards
4. Riding on equipment is prohibited except where designated for operator
5. Trouble shooting means finding the problem that occur in the equipment
6. In a step potential contact, current travels from one hand through the heart and out through the other hand.
7. In a touch/step potential contact, current travels from one hand, through the heart, down the leg, and out of the foot.
8. Participate in Occupational Health and Safety is the responsibility of the supervisor or the companies

Answer the following question!	
Note: **Satisfactory rating - 8 and 15 points**	**Unsatisfactory - below 8and 15points**
You can ask you teacher for the copy of the correct answers.	

Answer Sheet

Name: _____

1. True
2. True
3. True
4. True
5. true
6. false
7. true
8. False

Information Sheet- #2	Prepare required tools, materials

This is the journey level class performing skilled maintenance and repair of Copying machines, printer, scanner, fax, Cabling, antennae, and public address and other Audio, video and data transmitting, transmission, receiving and recording equipment, systems and devices. Incumbents work independently according to accepted standards of the trade, supervisory direction and District procedures and practices. Incumbents at this level are expected to select appropriate tools, materials and approach to the work. This class is distinguished from other electronic technician classes in that the duties relate specifically to the maintenance and repair of specialized communications and related equipment

List of hand tools and their functions

Service technician must have to know electronic communication tools and equipment; and their function before become to be technician.

- Communicate more effectively and efficiently with tools you probably have at your disposal
- Motivate your audience to act through the tone and style of your communications.
- Know the latest in Communications to stay on top of trends and reach different levels of your audience.

Fig: Electronics toolkit

BASIC ELECTRICAL TOOLS, EQUIPMENT, AND THEIR USES

Pliers

Pliers are available in different types, shape, and sizes. They are also available in both insulatedand un insulated handles. An insulated handle should be used when working on or near hot wires. It isalso used for cutting big and small wires.

Splicing Tools

Long Nose: It is used for holding, bending and stretching the lead of electronic component or connecting wire.

Side Cutter: It is a wire-cutting plier, though they are not used to grab or turn anything, but are used to cut wire.

Screw Drivers

A screwdriver comes in various sizes and with several tip shapes. Screwdrivers used by electricians should have insulated handles. Using a screwdriver for a particular job, the width of the screwdriver tip should match the width of the screw slot.

Screw driver. It is a device specifically designed to insert and tighten or to loosen and remove screws. A screwdriver comprises a head or tip which engages with a screw, a mechanism to apply torque by rotating the tip and some way to position and support the screwdriver. A typical hand screwdriver

comprises an approximately cylindrical handle of a size and shape to be held by a human hand and an axial shaft fixed to the handle, the tip of which is shaped to fit a particular type of screw.

Flat Screwdriver. It is used to drive or fasten negative slotted screws.

Phillips Screw driver. It is used to drive or fasten positive slotted screws. It is a screwdriver that could take greater torque and can provide tighter fastenings.

Precision Screwdriver Set. It is a set of small screw drivers composed of slotted and Philips screwdrivers

Drilling Equipment

Drilling equipment is needed to make holes in building structure passages of conduits and wires.

Selecting testing instrument

Below are the lists of measuring instruments used in electrical and electronic work.

Types of test equipment

1. The following items are used for basic measurement of voltages, currents, and components in the circuit under test

Multimeter e.g., VOM (Volt-Ohm-Millimeter) or DMM (Digital Multimeter) (Measures all of the above)

Voltmeter (Measures voltage)

Ohmmeter (Measures resistance)

Ammeter, e.g. Galvanometer or Milli Ammeter (Measures current)

Sawing and Cutting Tools

Saws commonly used by electricians include the crosscut, keyhole, and hacksaw.

Soldering Equipment

In doing electric wiring, splices and taps (connections made to wire) should be soldered, unless you use solder less connectors. Typical equipments available for soldering are shown below.

Hammers

Hammers are used with chisels and for nailing and fitting. Below are examples of carpenter'sclaw hammer, lineman's hammer, and machinist's ball-peen hammer.

Measuring Tools

To measure wire length and other items, the electrician finds considerable use for measuring tools such as the extension or zigzag rule, push-pull rule and a steel tape as shown below.

- *This above all stated and other hand tools that are not mentioned are crucial things; that any technician must know*

Self-Check 2	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:
Choose the best answer from the question below

_____1. Which one of the following to check the flatness of machined mating surfaces.

A. Micrometer
B. Straight edge
C. Steel ruler
D. All

_____2. Which one of the following is apply the correct level of torque.

A. Steel ruler
B. Plastic ruler
C. Torque wrench
D. micrometer

_____3. Which one of the following is simple half-disc instrument.

A. Protractor
B. Ruler
C. Torque gauge
D. None

_____4. Which one of the following is marking and measuring a piece of wood. A. Steel ruler

B. Multi meter
C. Try square
D. micrometer

Answer the following question!	
Note: **Satisfactory rating - 8 and 15 points**	**Unsatisfactory - below 8and 15points**
You can ask you teacher for the copy of the correct answers.	

Answer Sheet

Name: _____

1. B
2. C
3. C
4. C

Information Sheet#3	Home office and multimedia equipments servicing

Home Office equipments: Equipment used in a domestic/household environment Application of this symbol on your equipment is confirmation that you should not dispose of the equipment in the normal household waste stream.

- **Electrical Safety**

Use only the power cord supplied with this equipment.

Plug the power cord directly into a correctly grounded electrical outlet. Do not use an extension cord. If you do not know whether or not an outlet is grounded, consult a qualified electrician.

Do not use a ground adapter plug to connect this equipment to an electrical outlet that lacks a ground connection terminal.

You may incur a severe electrical shock if the outlet is not grounded correctly.

Do not place the Xerox Nuvera Printer where people may step or trip on the power cord. Do not place objects on the power cord.

Do not override or disable electrical or mechanical interlocks.

Do not obstruct the ventilation openings. These openings prevent overheating of the machine.

Never push objects of any kind into slots or openings on this equipment. Making a contact with a voltage point or shorting out a part may result in fire or electrical shock.

- **Emergency Power Off**

If any of the following conditions occur, immediately switch off the power to the machine and disconnect the power cord from the electrical outlet. Call an authorized Xerox service representative to correct the problem. The machine emits unusual noises or odors. The power cord is damaged or frayed. A wall panel circuit breaker, fuse, or other safety device is tripped. Liquid is spilled into the Xerox Nuvera Printer. The machine is exposed to water. Any part of the machine is damaged.

- D
  isconnect device

The power cable is the disconnect device for this equipment and is attached to the back of the machine as a plug-in device. To remove all electrical power from the machine, disconnect the power cable from the electrical outlet.

WARNING: *This product must be connected to a protective earth circuit.*

- L
  aser Safety

This product complies with safety standards and is certified as a Class 1 Laser product under the Center for Devices and Radiological Health (CDRH) of the United States Food and Drug Administration (FDA) implemented regulations for laser products. This product complies with FDA 21 CFR 1940.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated July 26, 2001. These regulations apply to laser products marketed in the United States. The label on the machine indicates compliance with CDRH regulations and must be attached to laser products marketed in the United States. This product does not emit hazardous laser radiation.

CAUTION: *Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous exposure of laser light.*

Since radiation emitted inside this product is completely confined within the protective housing and external covers, the laser beam cannot escape from the machine during any phase of the user operation. This product contains laser-warning labels. These Labels are intended for use by the Xerox

Service Representative and are placed on or near panels or shields that require special tools for removal. Do not remove any of the panels. There are no operator serviceable areas in these covers

❖Ozone Information

This product produces ozone during normal operation. The ozone is heavier than air, and the quantity is dependent on print volume. Providing the correct environmental parameters, as specified in the Xerox installation procedures, ensures that concentration levels meet safe limits. Product Recycling & Equipment End of Life Disposal If you are managing the disposal of your Xerox product, please note that the product contains **lead, mercury** and other materials whose disposal may be regulated due to environmental considerations in certain countries or states. The presence of **lead** and **mercury** is fully consistent with global regulations applicable at the time that the product was placed on the market.

❖ Equipment used in a domestic/household environment

Application of this symbol on your equipment is confirmation that you should not dispose of the equipment in the normal household waste stream. In accordance with European legislation end of life electrical and electronic equipment subject to disposal must be segregated from household waste

Private households within EU Member States may return used electrical and electronic equipment to designated collection facilities free of charge. Please contact your local disposal authority for information.

In some Member States when you purchase new equipment your local retailer may be required to take back your old equipment free of charge. Please ask your retailer for information.

❖ Equipment used in a professional/business environment

Application of this symbol on your equipment is confirmation that you must dispose of this equipment in compliance with agreed national Procedures.

❖ Resources

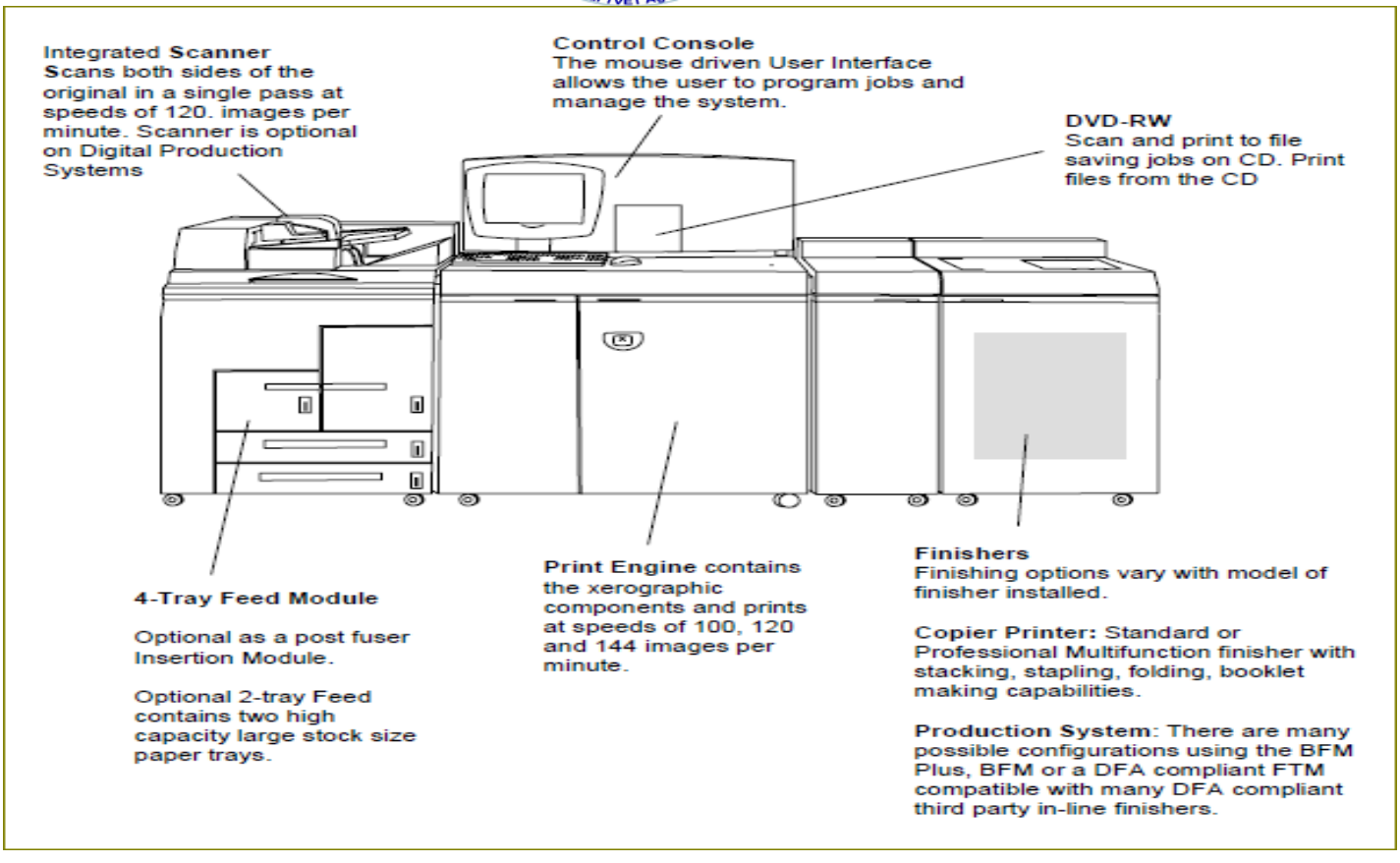
There are many documents and resources available to help you learn about and how to use your Xerox Nuvera. Documentation and Materials Kit This kit ships with every Xerox Nuvera System and contains the following documents

Sections on the *UGTA* CD System Tour How to use Troubleshooting Problem Solving Maintenance

- Documents (pdf files) on the *UGTA* CD *Production System Paper Guide 5 Habits for Enhanced Feeder Performance Best Practices for Jam Clearance printer act, Xerox Remote Services Getting Started* Guide
- System Administrator's Guide (SAG) - CD
- DocuSP Customer Documentation - CD
- DocuSP Remote Workflow (DRW) - CD
- Centre Ware Printer Drivers - CD

System Overview

Use the diagram below to familiarize yourself with the basic Xerox Nuvera System. Configurations vary with the system installed.



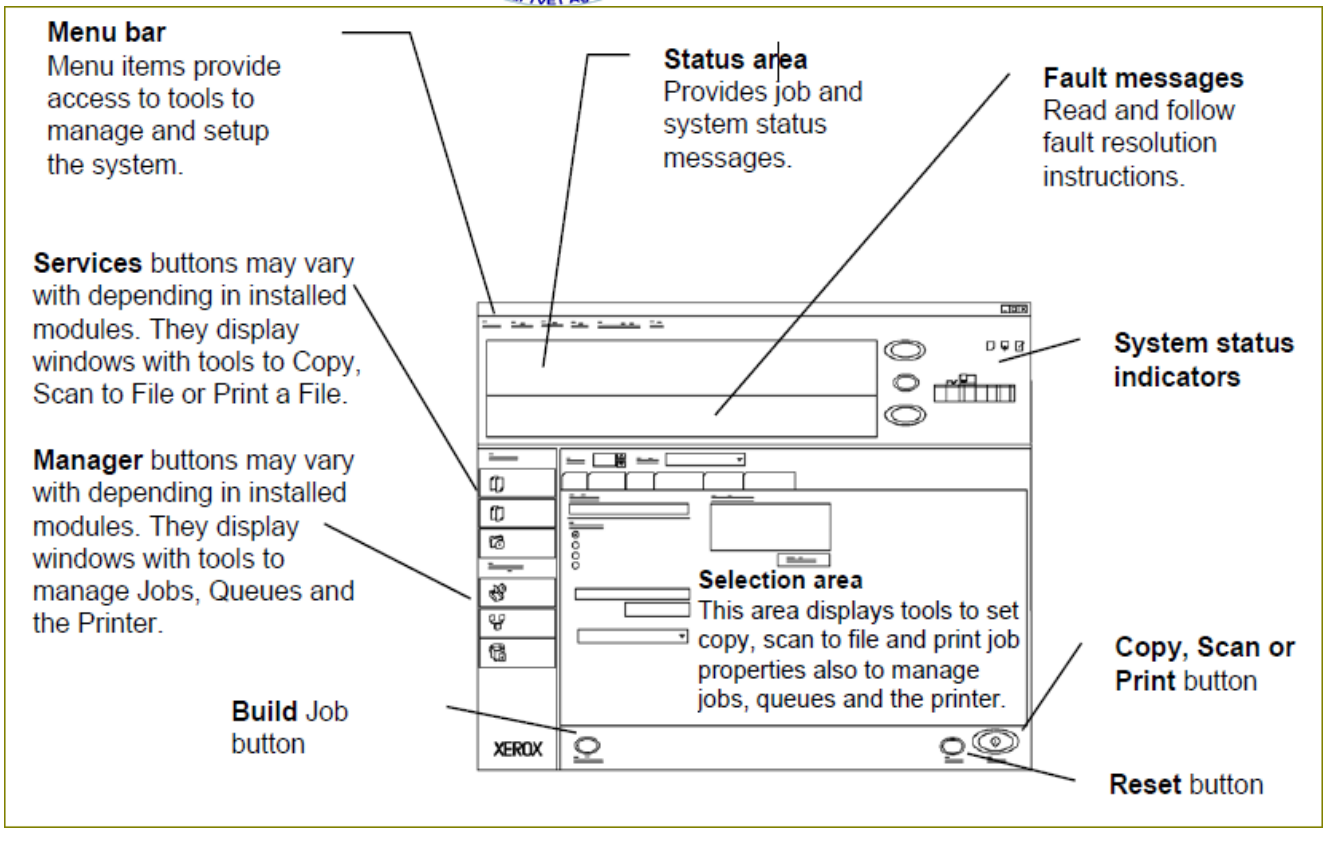
System Administrator Guide CD: Contains the instructions necessary to install and maintain the system on a network.

Do cusp Customer Documentation CD: Contains general Do cusp documentation.

What can you do with this system?

User Interface

The NEW LOOK User Interface is a visual tool for accessing the tools and features for managing the Xerox Nuvera.



Make a Copy

Copy on systems with an Integrated Scanner, enables access to the job properties used to prepare a job to print scanned images. Select Copy to display the job properties window.

Each tab lists property settings to program job.

1. Select **Copy**.
2. Load a set of 1-sided originals into the Document Handler.
3. Set the job properties to make a number of 2-sided copies. Make sure you set the Image Quality setting appropriate to the type of original to be scanned.
4. Click Start to begin scanning.

Refer to the **How Do I: Copy my document** section of the Xerox *Nuvera User Guide and Training Aid CD* for procedures for setting job properties for scanning.

Basic	Advanced	Output	Image Quality	Image Edit	Special Pages
Paper Stock Sides Imaged Reduce/Enlarge Darken/Lighten Stapling/Finishing Collation	Job Name Destination Start Message	Stapling/Finishing Output Location, Output Order Output Delivery Slip Sheets Set Sample Layout Annotations	Original Type Mixed Text & Graphics Text Mixed Text & Halftones Photo Rendering Options Image Adjustments Contrast Sharpness Print Quality Background Suppression	Original size Edge Erase Image Shift Image Rotation Negative/Mirror Image	Front Cover Back Cover Exception Pages Inserts

Scan to File

Scan to File, on systems with an Integrated Scanner, enables access to the job properties used to scan and save a hardcopy job. Saved jobs are located under Job manager: Saved Jobs. Using Scan to File you can:

- Scan and save documents as: PDF, Multi-Page Tiff or Single page TIFF
- Scan and save files on a CD-ROM, local server or networked server
- Print the files on other Nuvera systems with the same high image quality

Select **Scan to File** to display the job properties window.

Select **Scan to File** to display the job properties window.

Basic	Image Quality	Image Edit
Job Name Save Job Location Save Format Sides Imaged Reduce/Enlarge Darken/Lighten Resolution	Original Type Mixed Text & Graphics Text Mixed Text & Halftones Photo Rendering Options Image Adjustments Contrast Sharpness Background Suppression	Original size Edge Erase Negative/Mirror Image

Practice

1. Select **Scan to File**.
2. Load a set of originals into the Document Handler.
3. Select a **Save Location** and a **Save Forma**t.
4. Set job properties including image quality settings.
5. Select the Green Start button. Refer to the

How I do: Scan my document section of the *User Guide and Training Aid*.

Print from File

Print from File enables access to features that allow you to print PDF, PostScript, PCL, and TIFF, ASCII files from CDs or networked servers. Select **Print from File** to display the job properties window.

Files	Basic	Output	Image Quality	Image Edit	Special Pages
File Name When job opens: Pages to print Document format Job Name Destination Target Printer Start Message Administration Pages	Paper Stock Sides Imaged Stapling /Finishing Collation	Stapling/Finishing Output Location Output Order Output Delivery Slip Sheets Set Sample Layout Annotations	Mode Print Darkness Print Quality Resolution Halftones Stroke Thickening	Image Shift Rotation Background Form	Front Cover Back Cover Exception Pages Inserts

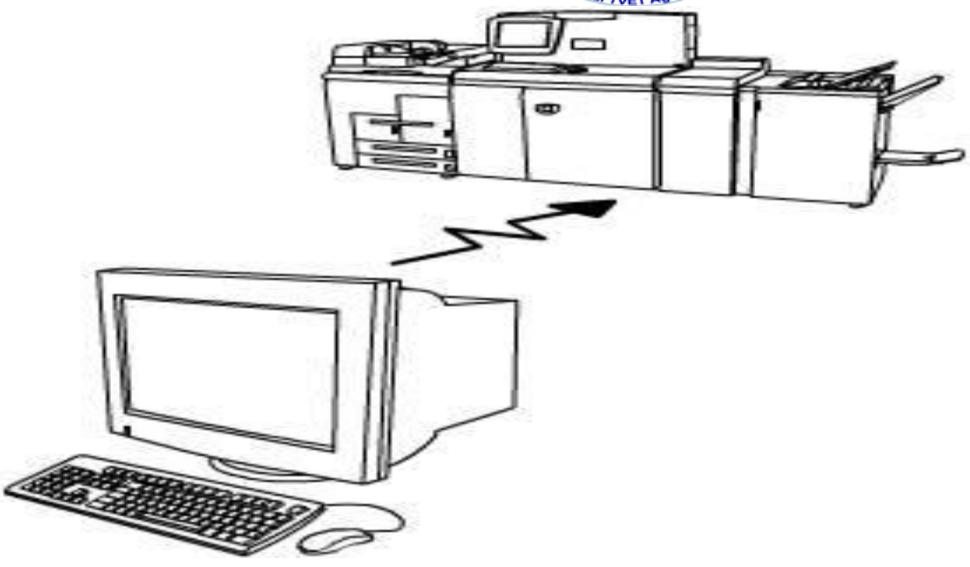
Practice

To print a job that resides on a CD or networked server:

1. Select **Print from File**.
2. If printing from a CD, place the CD in the CD drive and wait until the LED stops blinking.
3. Browse to locate the job (on a CD or on a networked server). When a job is selected the job properties window displays with the job information. 4. Set the job properties.
5. Print the job.
6. If you used a CD, select **System: Eject CD**.

Refer to the **How do I: Print my document** section of the *User Guide and Training Aid*.

Print from a Workstation



Jobs can be submitted from a networked client workstation to a Xerox Nuvera System from either an application using a print driver, or from a web browser. Types of files that can be printed include: PDF, TIFF, ASCII, PostScript and PCL. Printing to a Xerox Nuvera System from a client workstation requires:

• A Xerox Nuvera System connected to a network

• The Xerox Nuvera System IP address to install the Xerox Nuvera system on the workstations

• Print drivers loaded on the client workstations installed on the network

Print Driver - The Xerox Nuvera System print drivers must be installed on the networked workstation.

Web Submission - Open a Web Browser and enter the Xerox Nuvera System's IP address on the web browser's address line to system display the Web Submission screen.

Hint: You can obtain the system's IP address using the Call for Assistance feature. In the *System* drop down menu, click on *Call for Assistance*. Locate the IP address.

Practice

- Load the print drivers onto a networked client workstation.
- Submit a print job from a client workstation using the print drivers.

- Submit a print job using web submission.
- Use the Xerox Nuvera controller to print the job Refer to the **How do I: Print my document** section of the *User Guide and Training Aid*.

Fault icon	Meaning
	System fault. The printer will not function. Double click on the fault icon to open a window describing the fault and action required to clear it.
	Informational fault. The system should continue to function. Read and follow fault instructions.
	Low Priority fault. The system needs attention but may continue processing or printing if the job does not require the resources indicated by the fault.

Equipment Training Resources

Home Office Printers and Photocopiers

Photocopiers are standard pieces of office equipment, and have been since the 1970s. As technology has developed, the majority of photocopiers in offices today are ‘multifunction’ devices It can be hard to distinguish the difference between a photocopier and a scanner as they appear to operate in similar ways, yet the method of output is vastly different. Home office printers and photocopiers are typically smaller in size, meaning they are able to fit into the smallest of home offices or studies. They are usually designed for a lot less use and therefore tend to have a lot less features – typically they do not print or copy in higher volumes or at extra fast speeds. The home office printer or copier is ideal for families, or home workers that do not print a lot or require additional technology features, such as network connectivity.

Desktop Printers and Photocopiers

Desktop printers like home office printers, are generally smaller in size in order to enhance office space utilisation. Desktop printers are compact and quite literally sit comfortably on a desk top, increasing available floor space. They are ideal for small teams that need constant access to a printer or copier.For small teams that want to be able to have more functionality, without using up valuable office space, desktop photocopiers allow users to print, copy and scan.

Floor-standing Printers

Floor-standing printers, also known as office printers take up more space than desktop machines; however their benefits usually outweigh the space they use for most businesses. That being said, they do come in different sizes, so there are options for choosing a printer to suit the available space. Floor-standing printers are capable of near constant and consistent printing. Office printers are able to print on a variety of paper size, including A3 paper due to the machines larger paper storage space.

Floor-standing Photocopiers

Similarly, to floor-standing printers, these copiers take up a larger space than their more compact desktop photocopier counterparts, but you can typically pick a machine that suits the space. Bear in mind however that the larger the print dimensions you need then the larger the machine will be. Floor-standing photocopiers, or office photocopiers, are multifunctional devices, providing print, copying, scanning, email, and faxing facilities, making these machines ideal for organizations that require more than just basic print capabilities.

Multifunction Printers

Multifunction printer is an alternative name for a modern day photocopier. Multifunction printers have much better specifications than standard printers. They are typically larger and floor standing in order to accommodate for the additional features. Multifunctional printers normally allow you to print in different sizes, print in colour or mono (black and white), print from different devices, fax, scan, copy.

Digital Press

In the past five years, digital press machines have become cheaper and have developed more advanced capabilities. It is for this reason that companies are increasingly using digital print machines, bridging a long-time gap in the market, and allowing organisations that need light duty print capabilities to do so in-house. Also known as light production, these devices are typically very fast and an exceptional print quality. These machines are ideal for companies that wish to print high quality documents at superfast speeds, but with added finishing options you would normally associate with outsourced printing. Digital presses are normally found in reprographics departments, and can print thousands of sheets per day.

Elements multimedia

Whether or not they have used a computer, most people are familiar with text. Text is the foundation for word processing programs and is still the fundamental information used in many multimedia programs. In fact, many multimedia applications are based on the conversion of a book to a computerized form. This change gives the user instant access to the text and lets him or

her display pop-up windows, which give meanings of certain words. Multimedia applications also enable the user to instantly display information related to a certain topic that is being viewed.

Text

The combination of audio sound into a multimedia application can offer the user with information not likely finished any other technique of announcement .Some types of information can't be taken efficiently without using sound. It is closely impossible, for instance, to provide a precise word-based explanation of the bear of a heart or the sound of the ocean.

Audio sound can also strengthen the users considerate of information obtainable in another type of media. For example, a description might define what is being seen in an animation clip.

Static Graphics images:

When you imagine graphics images you believably think of "still" images-that is, images such as those in a photograph or drawing. There is no occurrence in these kind of picture. Still graphics images are an all-important portion of multimedia because humans are modality adjusted. As the old Chinese saying goes, "A picture is worth a thousand words. “Windows is also a sense modality environment. This kind displaying graphics images easier than it would be in a DOS-based environment. Static graphics images have a certain concept of formats and can be created in a number of various ways. Just as you can see an limitless number of photographs or pictures, the types of static graphics images that you can include in a multimedia application are almost unlimited.

Animation

Animation mention to moving graphics images. The happening of somebody giving CPR makes it much easier to learn internal organ revitalization, rather than just screening a static picture. Just as a static graphics image is a all-powerful form of human action, such is the case with animation. Animation is particularly useful for enlarge concepts that affect movement. Such thought as playing a guitar or hitting a golf ball are hard to exemplify using a single photograph, or even a ordination of photographs ,and equal more difficult to explicate using text. Animation form it easier to portray these characteristic of your multimedia application.

Full-Motion Video

Full-motion video, such as the images depicted in a television, can add even more than to a multimedia application. Although full-motion video may sound similar a perfect way to add a powerful message to a multimedia application, it is nowhere near the quality you would anticipate after watching television. Full-motion video is still in its occurrence stages on PCs, and it is constricted in resolution and size. Even with precocious methods of data compression, full-motion video can suck up hard disk space faster than waterfalls when poured out of a bucket.

FEATURES OF Multimedia:

Photo gallery:

Show your photos arranged in a nice-looking grid format.

Example:

Slideshows:

Combine your pictures with music and animate them in a slideshow.

Example:

Multimedia Audio player:

Add music, podcasts, or other audio files to your website.

Example:

Audio Player

Video player

Upload videos and display them in a professional player or embed videos directly from video sharing websites such as http://www.youtube.com.

Embedded documents

Embed already existing documents from script.com or other document sharing websites directly into your website for easy viewing.

Example: Invisible Alligators – Children's book by Hayes Roberts

OFFICE USING MEDIA TOOLS AND APPLICATIONS:

An office media equipment Application is an application which uses a multiple media foundations e.g. text, graphics, images, sound/audio, animation and/or video. Multimedia conference covers the certain tools functional in multimedia systems and key multimedia applications. It encompasses of Audio, video dispensation, Virtual reality and 3-D imaging, Virtual reality and 3-D imaging, Multimedia and Artificial Intelligence.

Multimedia Applications is the conception of exciting and innovative multimedia systems that connect information modified to the user in a non-linear communicating format. Multimedia conference deliberates the basic and novel features of multimedia document handling, programming, security, human computer interfaces, and multimedia application facilities.

- Audio, video processing
- Education and training
- Multimedia analysis and Internet
- Artificial Intelligence
- Virtual reality and 3-D imaging

Self cheek	**Written test**

Answer the following question

1. Write at lies 5 home office equipment ant its functions
   a. _____
   b. _____
   c. _____
   d. _____
   e. _____
2. What types of tools are service technician use during maintenance work
   a. _____
   b. _____
   c. _____

Answer the following question!	
Note: **Satisfactory rating - 8 and 15 points**	**Unsatisfactory - below 8and 15points**
You can ask you teacher for the copy of the correct answers.	

Answer Sheet

Name: _____

1. Photocopiers
2. Printer
3. Scanner
4. fax

a. Guide/ manuals

b. Testing instruments

c. Measuring instruments

Score = _____
Rating: _____

Date: _____

Information Sheet #4	Stage of development

In this instruction sheet any communication electronic service technician would have to know:

- ✓ **How to Install a small Internet Network**
- ✓ **Wiring Materials**
- ✓ **How to install and use Cisco packet tracer**
- ✓ **How to design small network through the Cisco packet tracer software**

How to install a small Internet Network

This project will focus on the installation of a simple internet network with 4 Electric plugs with wires UTP (RJ45).

Before we install the project we should learn the materials we need for this project.

Then, we draw the circuits and pipe scheme.

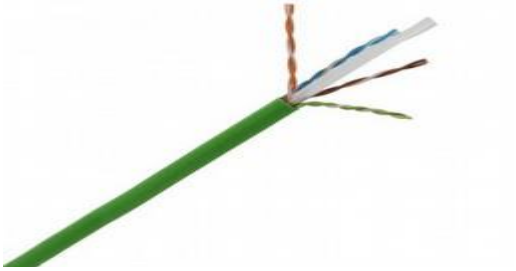
Then, we install the materials.

After installing the circuit, try if all the wires are connected properly.

A - RJ45 connector: RJ45

RJ45 (RJ means registered jack) is a standardized physicalnetwork interface for connecting telecommunications ordata equipment. It has 8 contacts and 8 positions.

B - Ethernet Cable



AnEthernet cable is one of the most popular forms ofnetwork cable used on wired networks. Ethernet cablesconnect devices together within a local area network, like PCs, routers, and switches. Given that these are physicalcables, they do have their limitations, both in the distancethat they can stretch and still carry proper signals, and theirdurability. This is one reason there are different types ofEthernet cables; to perform certain tasks in particular tuitions.

C- RJ45 plug:

RJ45 plug is a female connector. It has 8 positions and 8contacts. It is important, how we wire it. The same colorsmust be connected together

D - Wire canal:

Wire canal is used for pass cables UTP.

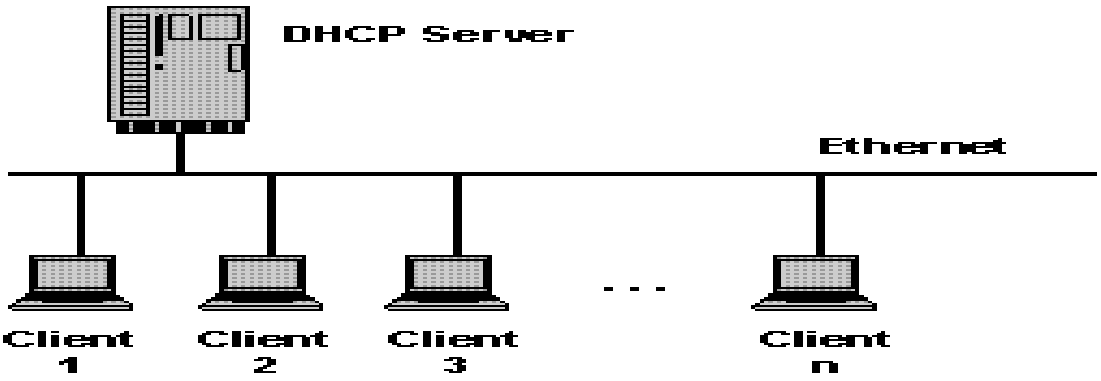
E – Configuration switches CISCO 2560:

A configuration switch works like a normal switch. You can plug in more Ethernet cables and use internet on more computers.

Step 1- Draw the Electric Scheme

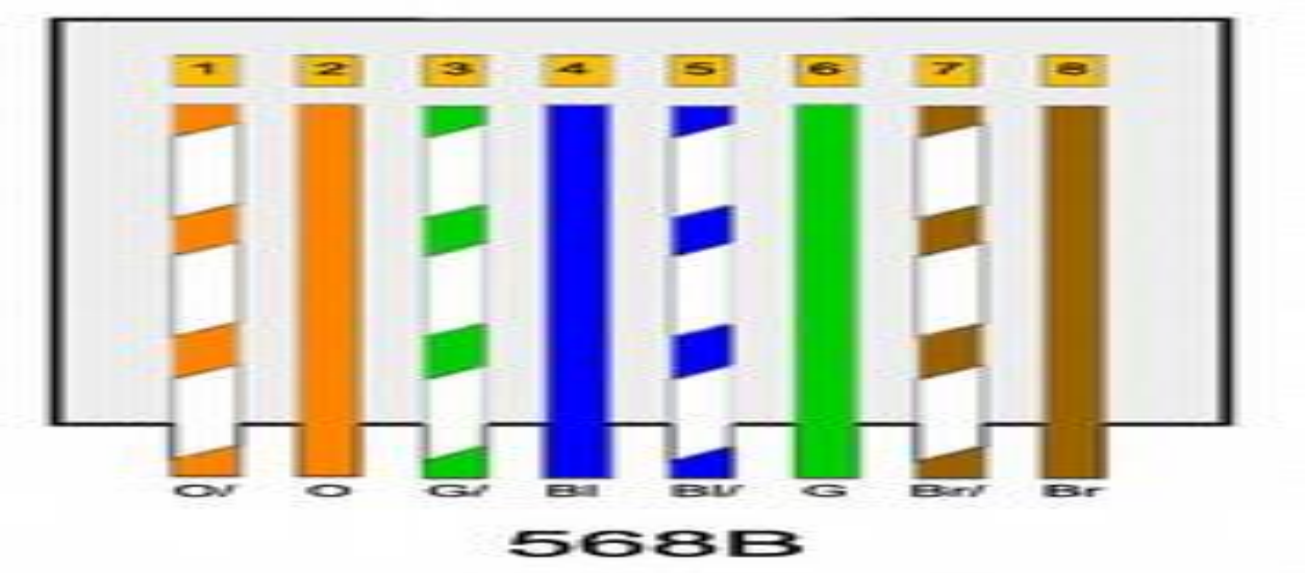
We should draw the electric scheme of a small internetnetwork connection.

Circuit Diagram:



Wire Installation:

You can follow wire installation, colors of wires and theorder of the wires.



Step 2 – Mount the Materials to the Board

Choose the correct positions for each material.

a. Mount the canal for the cables

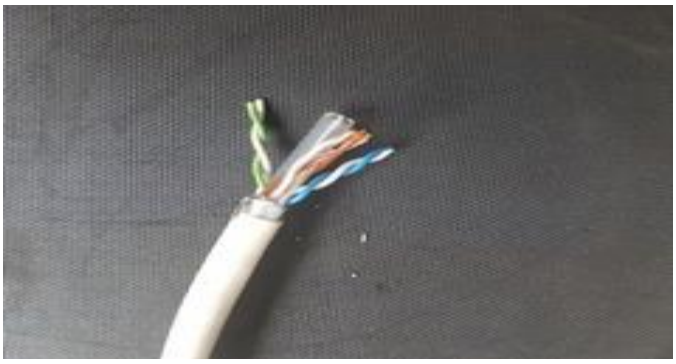
b. Mount the Ethernet sockets

c. Mount the switch

d. Mount the cables in the canals

Step 3 – Install the Wires

a. Remove the isolation of the end of each wire



b. At one end of thewire install a RJ45
Plug. Be careful toput the colors in theRight order.

c. Connect the other end of the wire to the ethernet socket. Be careful to put them in the same order as you put them at the other end.

d. Put the wires in the wire canal.

Step 4 - Test the Circuit

When we finished making the circuit, we had to test it. Weused the cable tester you can see on the photo. If all thelights on the tester are flicking, that means that all thecables are connected properly.

Things to Be Aware

I. Be careful not to leave any open space when insulatingthe cables with tape after connecting the cables.

II. Be careful not to tighten the screws too much wheninstalling the plastic because the plastic may break.

III. Be careful not to damage the conductors when openingthe terminals because the cables are thin

IV. Be careful to use the same order of wires of both endsof a cable, because otherwise it will not work.

V. Be careful when opening the terminals because you maycut yourself.

VI. When connecting the cables to the materials, connect them in the screw tightening direction.

Information Sheet #4	Internet wiring manual for technician

Straight-through, Crossover, and Rollover Wiring

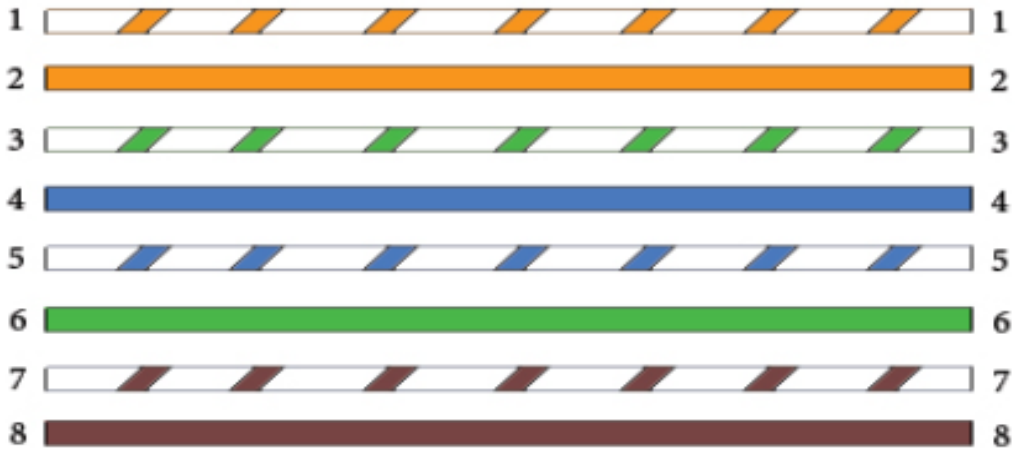
When talking about cable pinouts, we often get questions as to the difference in Straight-through, Crossover, and Rollover wiring of cables and the intended use for each type of cable. These terms are referring to the way the cables are wired (which pin on one end is connected to which pin on the other end). Below we will try to shed some light on this commonly confused subject.

Straight-Through Wired Cables

Straight-Through refers to cables that have the pin assignments on each end of the cable. In other words, Pin 1 connector A goes to Pin 1 on connector B, Pin 2 to Pin 2, etc. Straight-Through wired cables are most commonly used to connect a host to a client. When we talk about cat5e patch cables, the Straight-Through wired cat5e patch cable is used to connect computers, printers, and other network client devices to the router switch or hub (the host device in this instance).

- **Connector A**
- Pin 1
- Pin 2
- Pin 3
- Pin 4
- Pin 5
- Pin 6

- Pin 7
- Pin 8

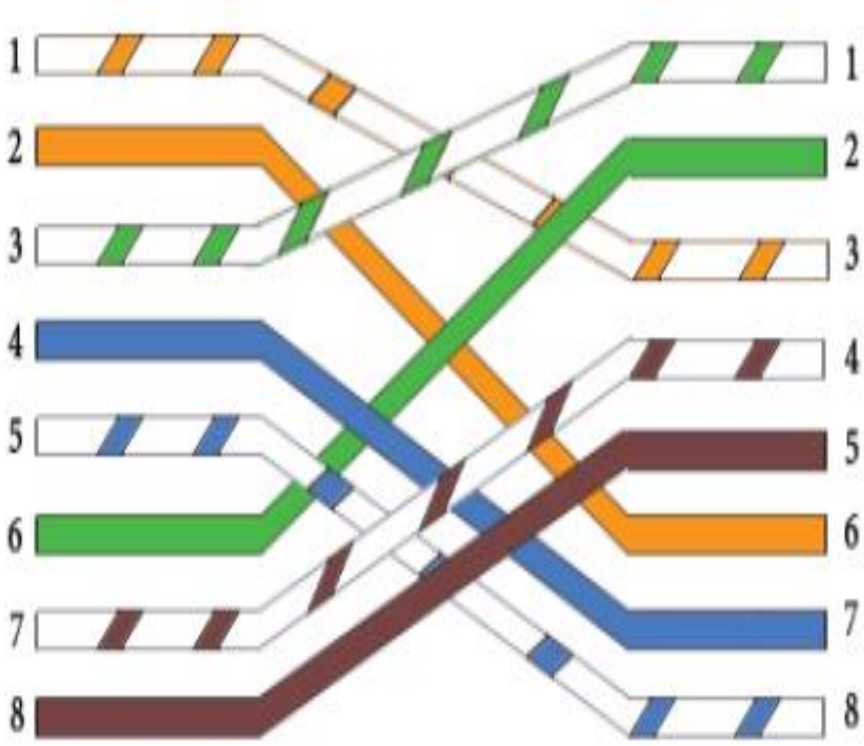


- **Connecto**
- Pin 1
- Pin 2
- Pin 3
- Pin 4
- Pin 5
- Pin 6
- Pin 7
- Pin 8

Crossover Wired Cables

Crossover wired cables (commonly called crossover cables) are very much like Straight-Through cables with the exception that TX and RX lines are crossed (they are at opposite positions on either end of the cable. Using the 568-B standard as an example below, you will see that Pin 1 on connector A goes to Pin 3 on connector B. Pin 2 on connector A goes to Pin 6 on connector B, etc. Crossover cables are most commonly used to connect two hosts directly. Examples would be connecting a computer directly to another computer, connecting a switch directly to another switch, or connecting a router to a router. *Note: While in the past, when connecting two host devices directly, a crossover cable was required. Nowadays, most devices have auto-sensing technology that detects the cable and device and crosses pairs when needed.*

- **Connector A**
- Pin 1
- Pin 2
- Pin 3
- Pin 4
- Pin 5
- Pin 6
- Pin 7
- Pin 8

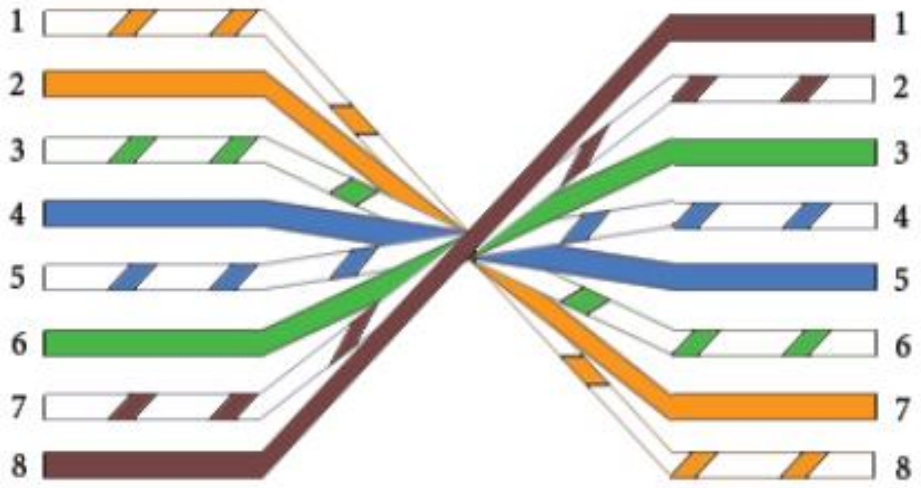


- **Connector B**
- Pin 1
- Pin 2
- Pin 3
- Pin 4
- Pin 5
- Pin 6
- Pin 7
- Pin 8

Rollover Wired Cables

Rollover wired cables, most commonly called rollover cables, have opposite Pin assignments on each end of the cable or, in other words, it is "rolled over." Pin 1 of connector A would be connected to Pin 8 of connector B. Pin 2 of connector A would be connected to Pin 7 of connector B and so on. Rollover cables, sometimes referred to as Yost cables are most commonly used to connect to a device's console port to make programming changes to the device. Unlike crossover and straight-wired cables, rollover cables are not intended to carry data but instead create an interface with the device.

- **Connector A**
- Pin 1
- Pin 2
- Pin 3
- Pin 4
- Pin 5
- Pin 6
- Pin 7
- Pin 8

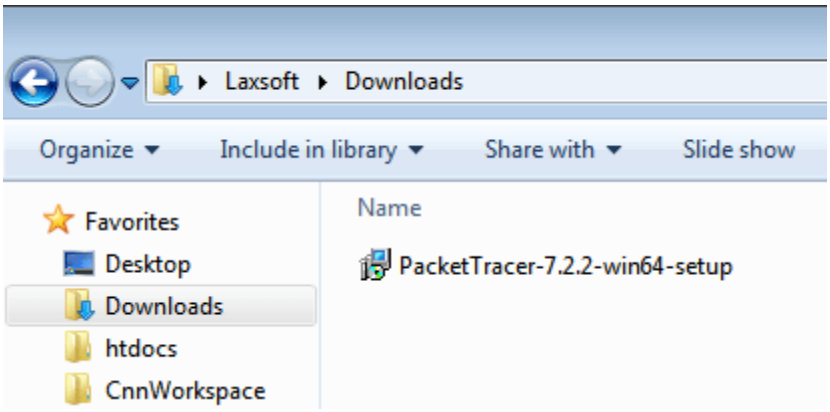


- **Connector**
- Pin 1
- Pin 2

- Pin 3
- Pin 4
- Pin 5
- Pin 6
- Pin 7
- Pin 8

How to install and activate packet tracer in Windows

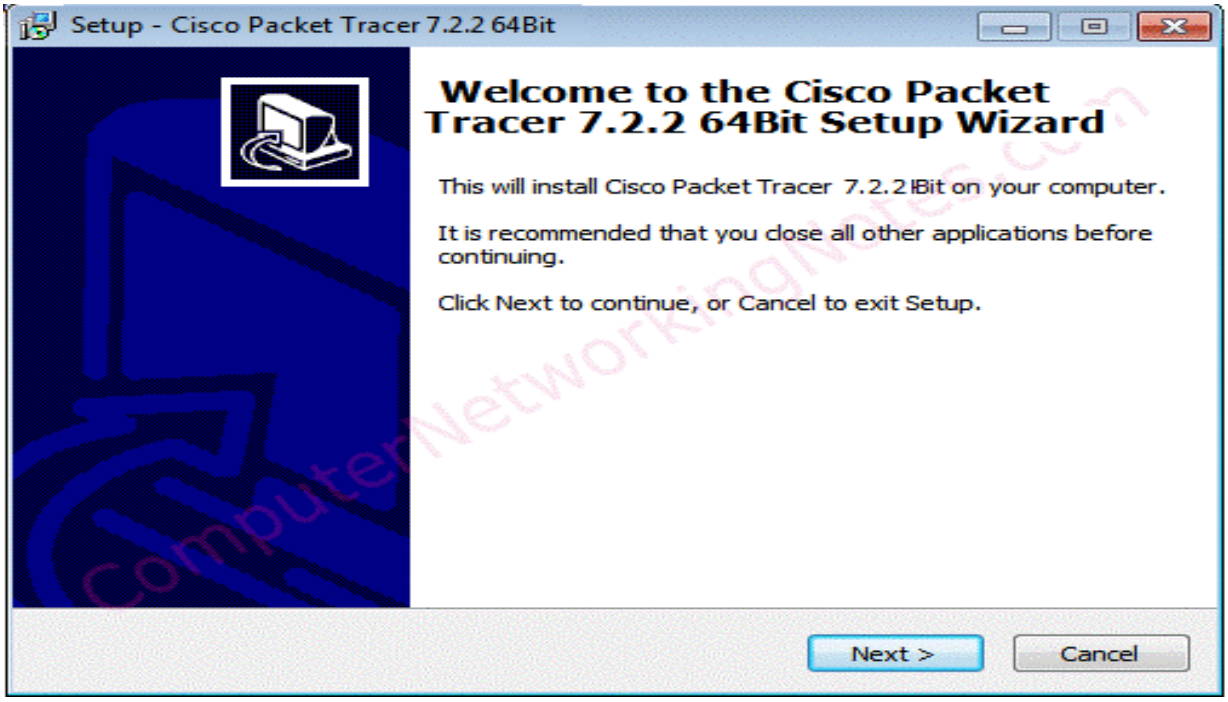
After downloading the Packet Tracer, open the folder that contains the downloaded file and click the setup file.



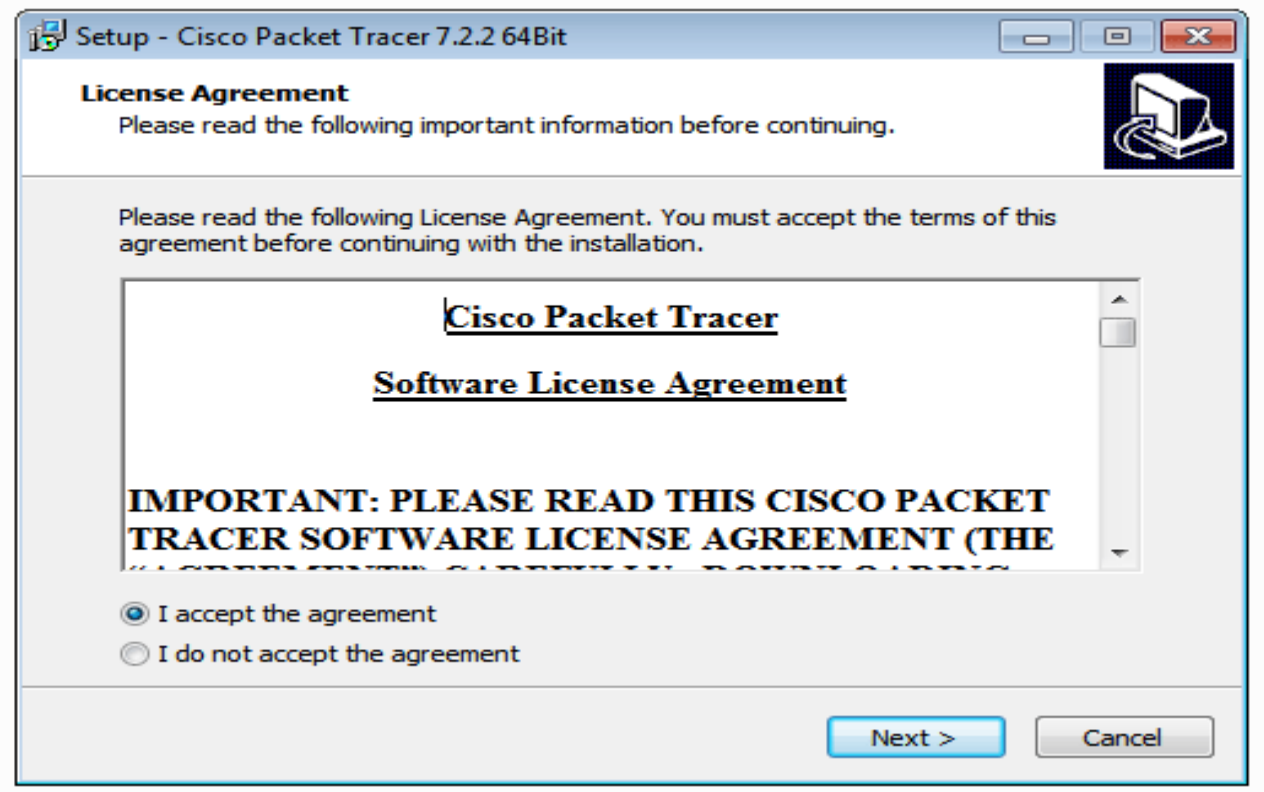
Depending on the (User Access Control) setting, Windows may ask to confirm the installation. If it asks, click the button to confirm the installation.

After confirmation, the installation starts in a graphical wizard. The first screen of the wizard presents a welcome message and an instruction to close all the running applications.

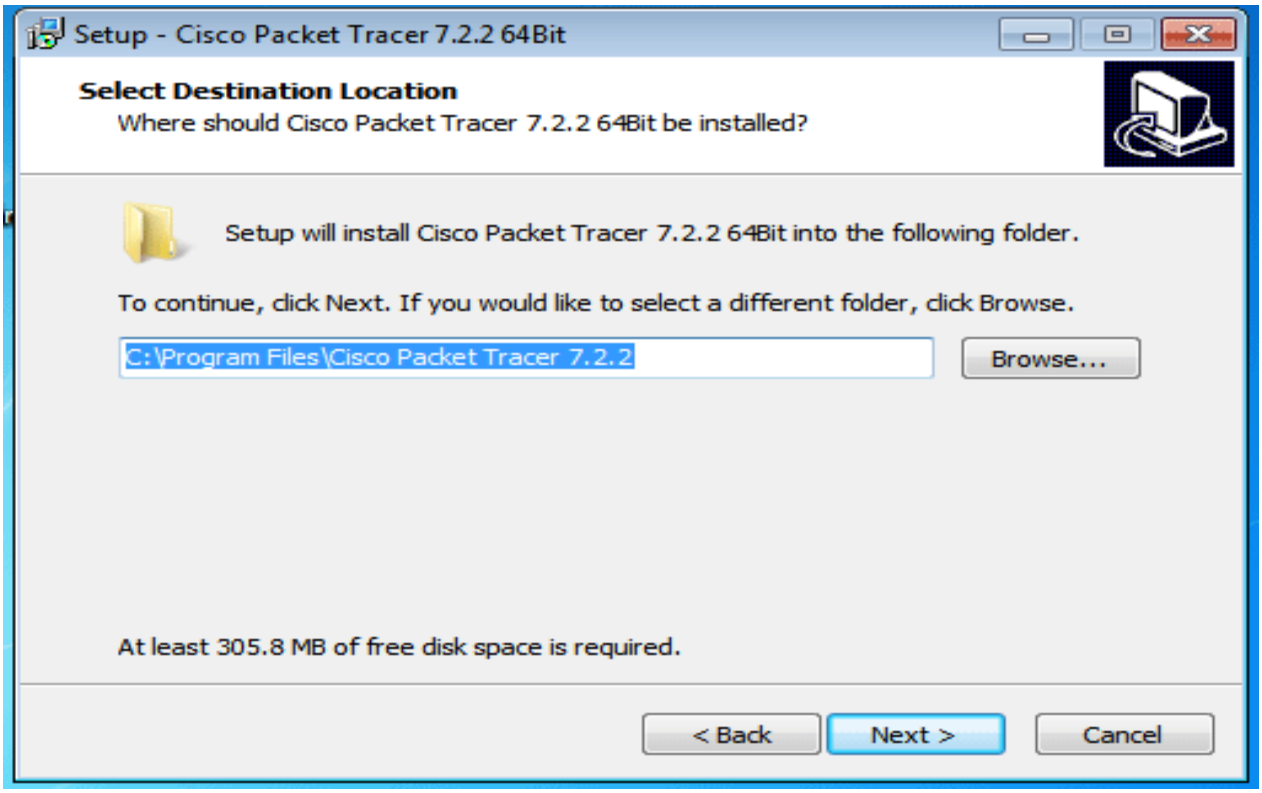
There is no need to close any application except web-browsers. The installation process adds a module in web-browsers. So if any web-browser is opened, close that and click the **Next** button.



The next screen displays the license agreement. Select the **"I accept the agreement"** option and click the **Next** button.



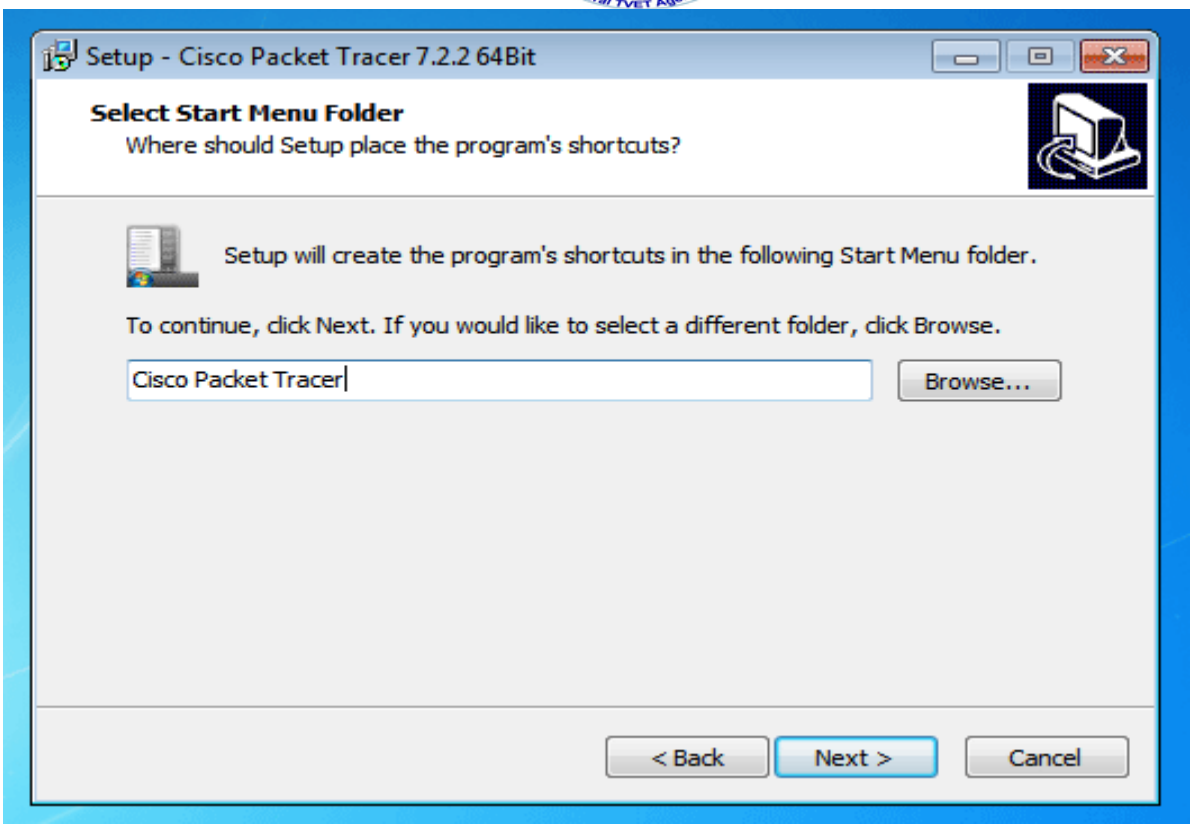
The next screen allows us to customize the installation directory. By default, the packet tracer is installed in the "Program File" folder of the Windows partition. If you want to install the Packet Tracer in another folder, click the **Browse** button and select the folder in which you want to install the Packet Tracer. Make your choice and click the **Next** button to continue the installation.



The next screen allows us to customize the shortcut-link name and the location of the Packet Tracer in the start menu.

A shortcut-link name is used to launch an application from the start menu. By default, the wizard uses the name **"Cisco Packet Tracer"** for both the folder-name and the shortcut-link name.

Keep default selections and click the **Next** button.

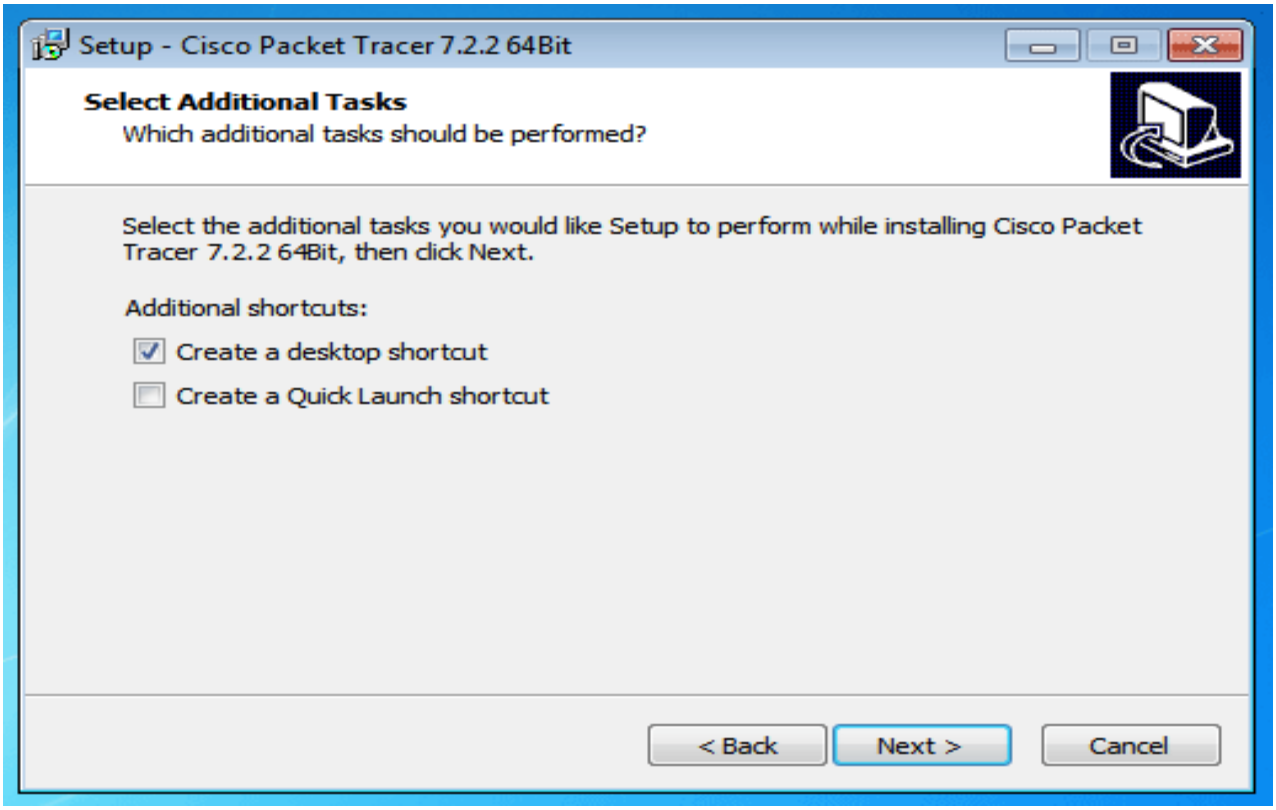


The next screen allows us to create two more shortcut links to launch the Packet Tracer.

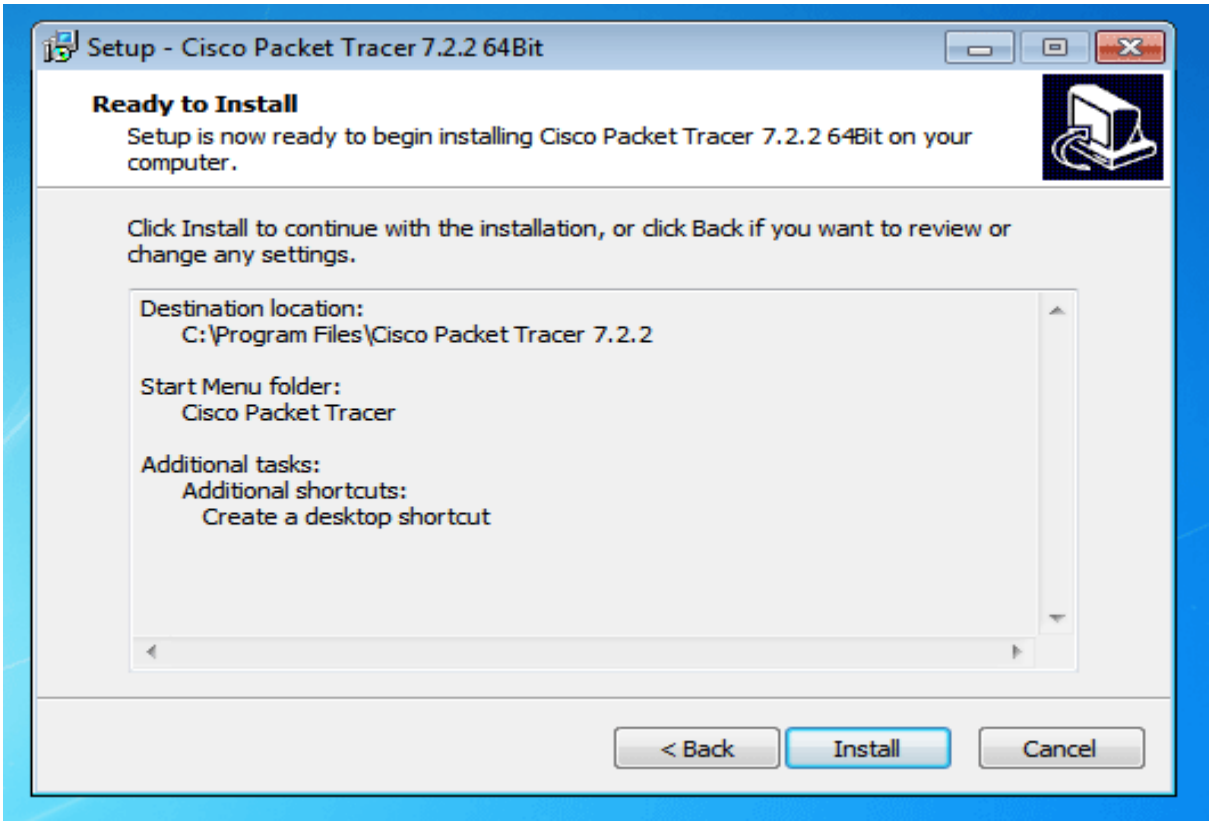
Create a desktop icon: - This option creates a shortcut link on the Desktop.

Create a quick launch icon: - This option creates a shortcut link in the Quick-Launch bar.

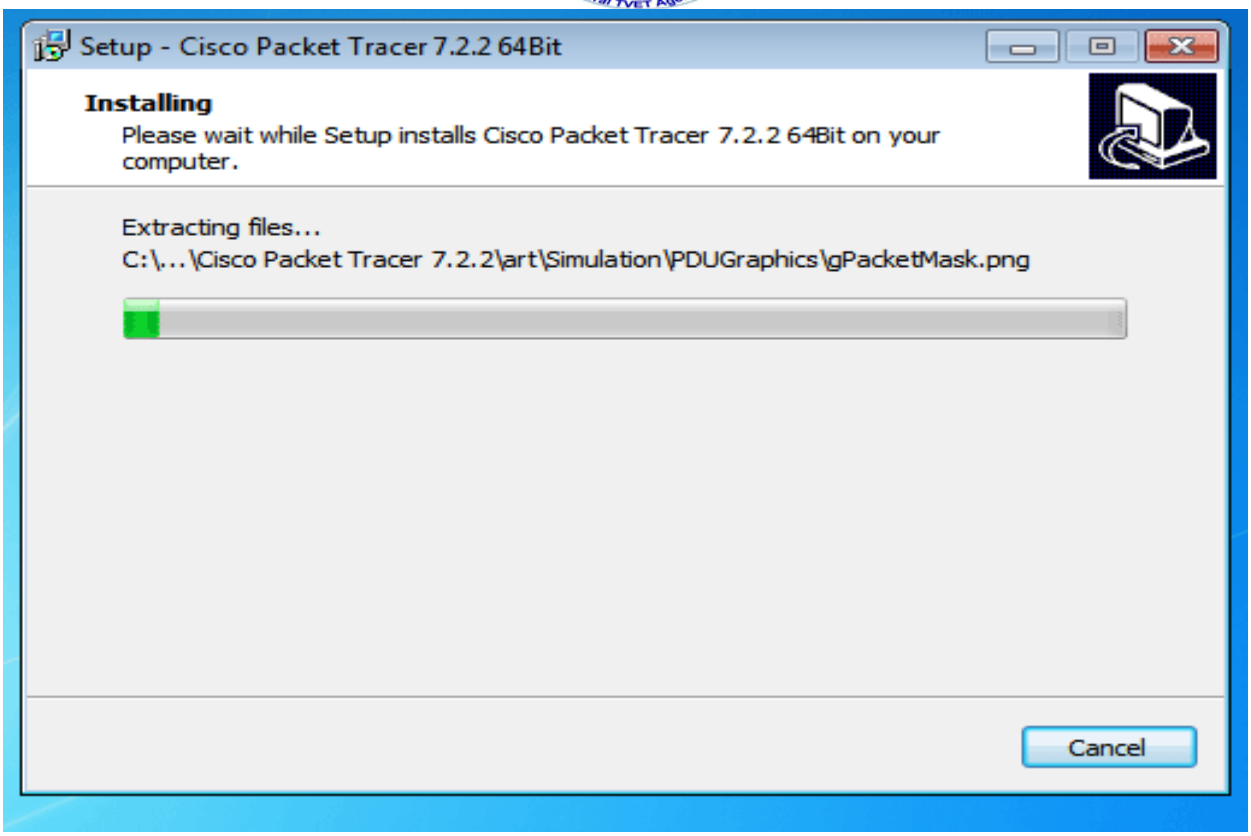
Make your choice and click on the **Next** button.



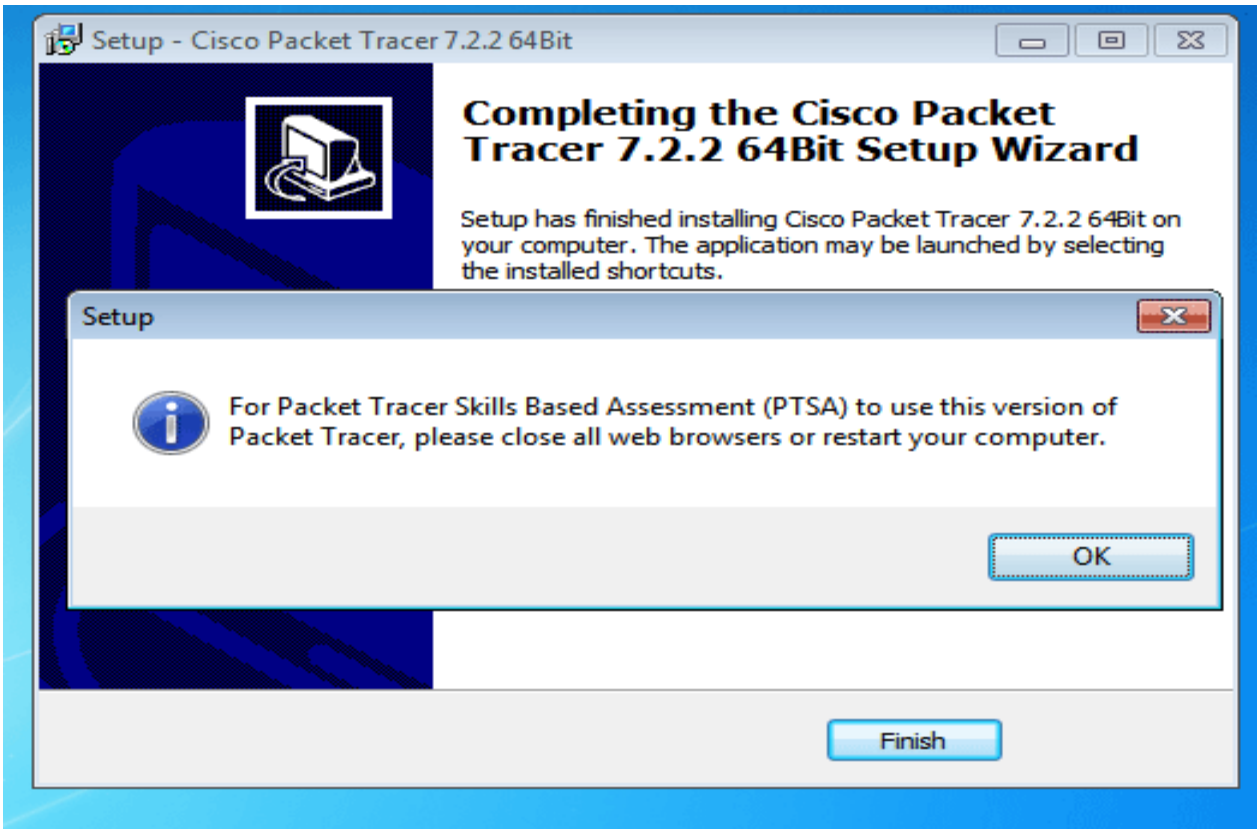
The next screen provides a summary of selections. If you want to change an option, use the **Back** button to get that option. To start the installation with currently selected options, click the **Install** button.



The wizard displays the real-time progress of the installation.



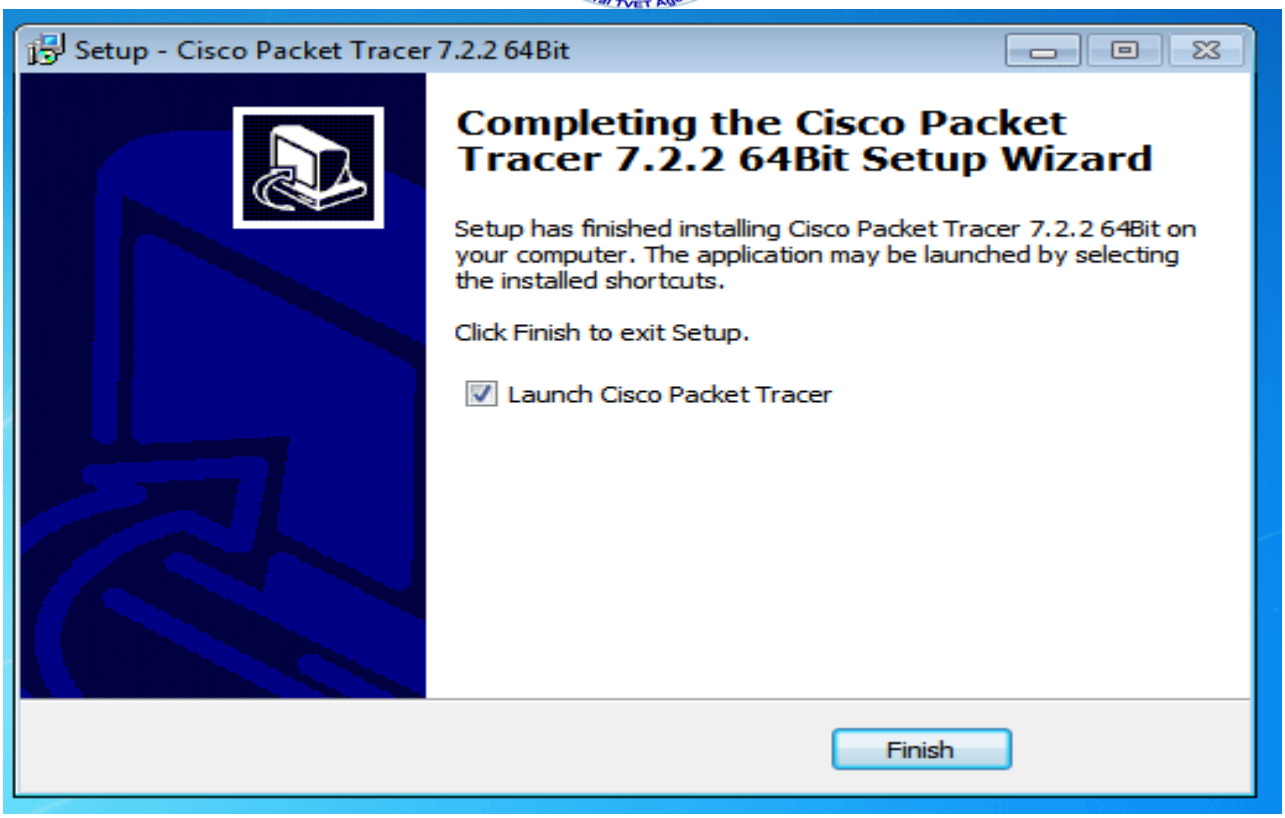
If the wizard detects an opened-browser during the installation, it displays a message to close that browser. Close all opened web-browsers and click the **Ok** button to continue the installation.



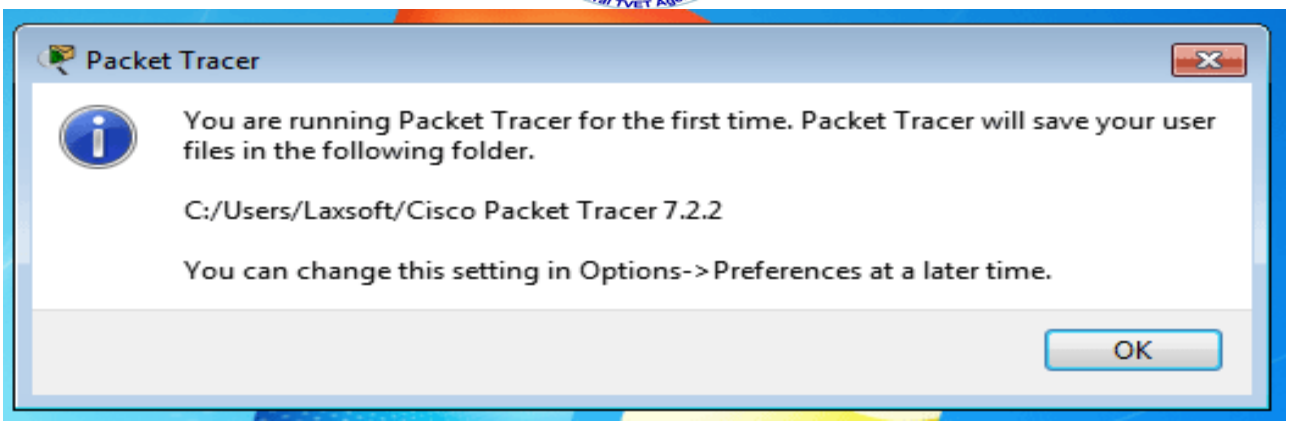
The last screen of the wizard displays the result of the installation. If any error occurred during the installation, this screen displays that error. If the installation process is completed without any error and notice, this screen shows the confirmation message.

If the installation is successful, this screen shows an option to launch the Packet Tracer. If you keep this option selected, the packet tracer starts when the wizard is closed.

Click the **Finish** button to close the wizard.



On the first run to save activities, the packet tracer automatically creates a folder. This setting, as well as other settings, can be changed at any time from the **"Options-> Preferences"** options.

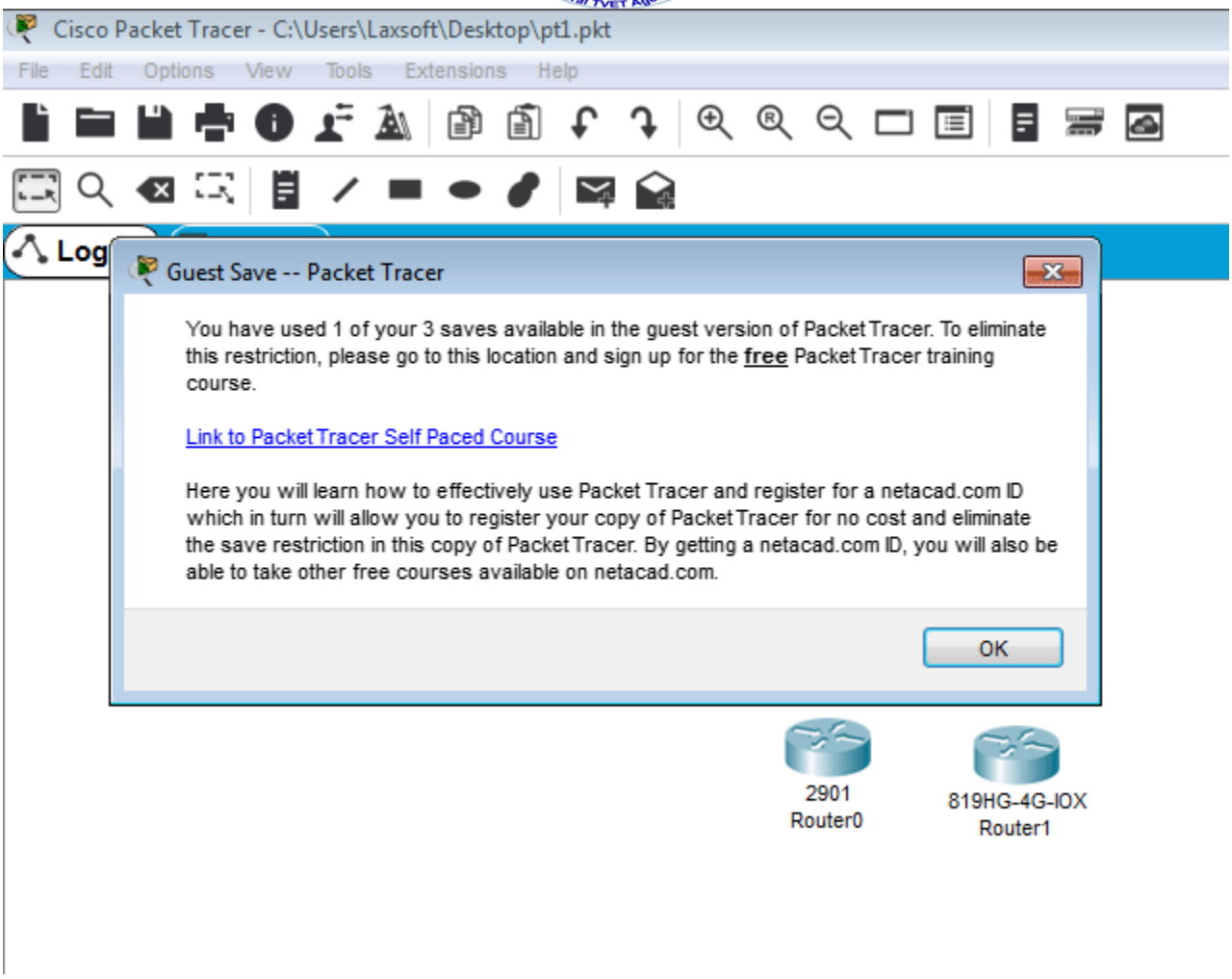


Activating Packet Tracer

Since version 7.0.0, the Packet Tracer can only be used after login. When you start the Packet Tracer, it presents a login box. If the system is not connected to the Internet, you can use the **Guest account** to access the Packet Tracer.

To use a guest account, click the **Guest login** button on startup

The guest account offers limited features. This account allows you to save only 3 practice labs.

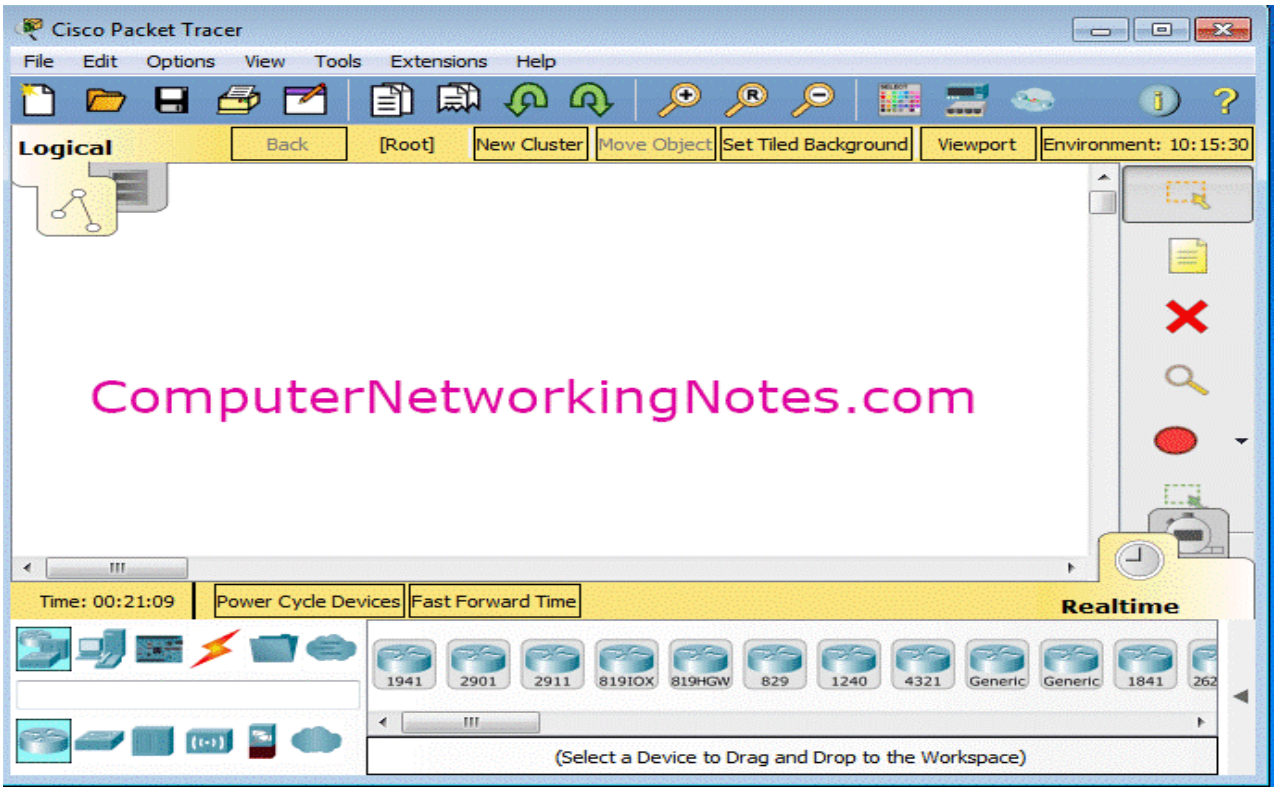


To remove this restriction, you must log in to the Packet Tracer from a Cisco Academy account. To create a free Cisco Academy account, visit the following web page.

https://www.netacad.com/courses/packet-tracer/introduction-packet-tracer

Visit the above web-page and create a free user account and use that user account to login to the Packet Tracer.

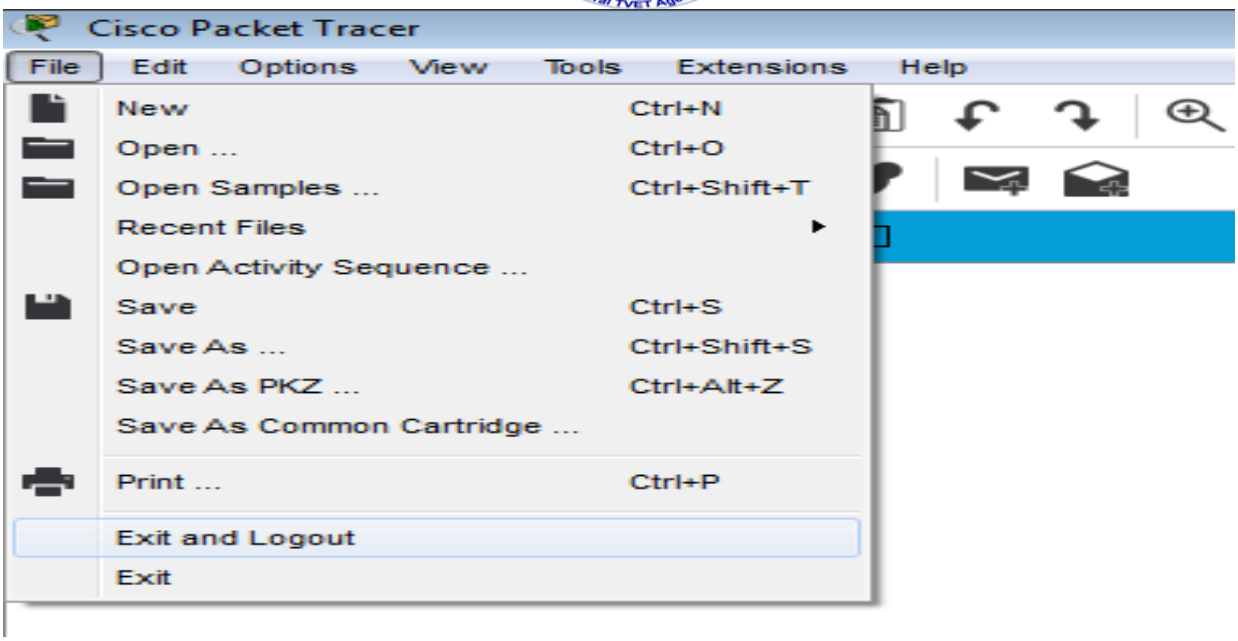
Upon successful authentication, the Packet Tracer will be activated and all restrictions will be removed.



To provide hassle-free access, the Packet Tracer automatically saves login information and uses that information to log in automatically when you start the Packet Tracer again at the next time.

The Packet Tracer does not ask you to login again until you log-out manually.

If you want to logout from the Packet Tracer, click the **File** menu item and click the **"Exit and Logout"** option from the sub-menu options.

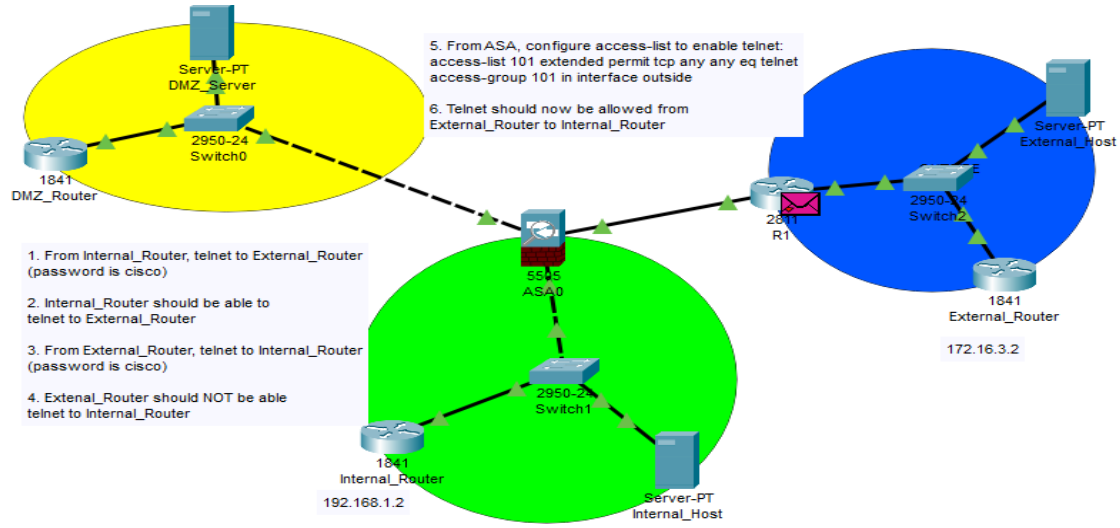


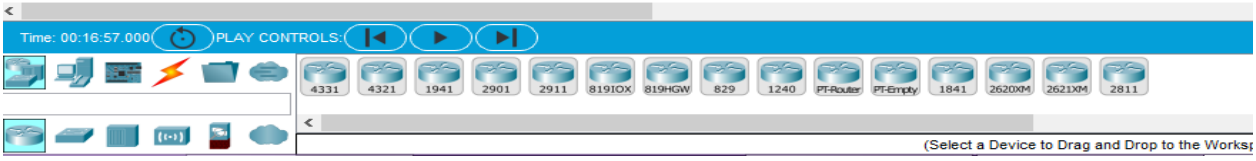
Once you are logged out, all restrictions will apply again. You must log in again to use the Packet Tracer without restrictions.

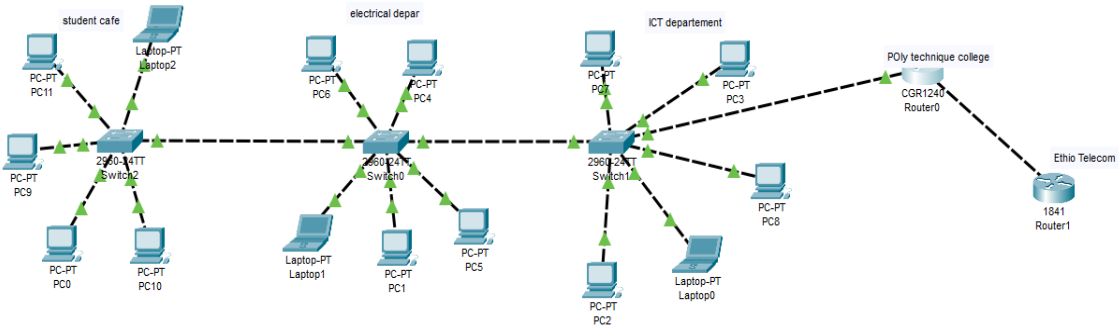
If you use multiple copies of the Packet Tracer to teach CCNA courses, there is no need to create multiple user accounts. You can use a single user account to log in as many copies of the Packet Tracer as you want. So instead of creating multiple user accounts, use only one user account to login to all copies of the Packet Tracer.

That's all for this tutorial. If you like this tutorial, please do not forget to share it with friends through your favourite social network

Designing and configuring computer network by using cisco packet tracer







Configuration manual

Basic switch configuration

Cisco IOS

Basic switch functions, names and passwords

The switch name is tool to let us see what device we are connected to. The prompt will display the name of the switch so

SW1>

Tells us that we are connected to a switch named 'SW1'. The prompt also tells another thing, “where” in the different hierarchical modes of the switch we are.

The switch has three basic modes, *unprivileged*, *privilege* (or *enable*) and *configuration mode*. The prompts are, in the same order:

SW1>

SW1#

SW1(config)#

The *configuration mode* actually has a few sub-modes like *interface configuration* and *line configuration*:

SW1(config-if)#

SW1(config-line)#

Some features, like the configuration VLAN, have their own sub-modes.

Moving between modes

Move between modes is done by calling the “name” of the mode if you want tomove up in the hierarchy and exit or end if you want to move down:

```
SW1>enable
SW1#configure terminal
SW1(config)#interface FastEthernet 0/1
SW1(config-if)#exit
SW1(config)#interface line console 0
SW1(config-line)#end
SW1#
```

Notice how the move from l*ine configuration* to *privilege mode* differs from themove from *interface configuration* to *configuration mode*? The command exitwill move you down one step while end will take you all the way back toprivilege mode no matter where you start.

Configuring a name

The *configuration mode* is mainly used for configuration that will affect the“whole” switch (in contrast to *interface configuration mode* that will only affectthe specified interface or interfaces). To change the name, move to *configurationmode* and execute the following command:

SW1(config)#hostname newHostname

newHostname(config)#

Command interpretation

When the switch interprets the commands entered, it compares the command tothe possible commands in that mode and if there is a single match with thecharacters given the switch executes the command.

An example might make it clear. Let's say we want to move from *unprivileged* to*privilege mode*. The command is enable.

SW1>enable

SW1#exit

SW1>en

SW1#

The same thing can be done with every command. As long as there's no othercommand sharing the characters given, the switch will accept the command as theone it can translate to. The hostname can therefore be set with the command:

SW1(config)#host newHostname

newHostname(config)#

Disabling DNS look-up

Apart from the command interpretation and shortening, the switch will interpretany unknown single command in unprivileged or privileged mode as an attempt tomake a telnet connection. This can be quite annoying since a spelling error forenable (let's say enable) could turn into a waiting period while the DNS timesout the switch realizes that it can't find an IP for 'enable'. The lookup will be doneeven if the switch don't have an IP enable interface.

To disable the DNS look-up (the telnet feature will still be there but the switchwill know that it won't be able to make the translation to an IP address and thereforeabort immediately) just issue the following command:

SW1(config)#no ip domain-lookup

Depending on the software, the domain-lookup part might be split into two(domain lookup).

The 'no' keyword

As we see in the command to disable DNS look-ups the keyword 'no' is set beforethe command. To enable look-up, just issue the command without the no. This isthe standard way to turn off function in Cisco IOS. For example if we want toenable an interface, we issue the no shutdown command and if we want todisable it, we just issue shutdown.

Passwords

Passwords can be configured to control how can access what on the switch.

Different passwords can be used to limit access to:

- the switch via the console (*unprivileged mode*)
- the switch via the network (*unprivileged mode*)
- privilege mode

Since the equipment in the lab is shared between multiple students groups there areonly three allowed passwords in the lab: *class*, *cisco* and *password*. For clarity,only the passwords *class* and *cisco* will be used in this document.

Privilege mode password (enable password)

There are actually two ways to configure the “enable” password for the switch,one in plain text (keyword password) and one that's encrypted using a specialform of the MD5 hash (keyword secret). This example will only show how toset the encrypted password:

SW1(config)#enable secret cisco

Whenever a user tries to move from the *unprivileged* to the *privilege modes*, aprompt will appear asking for the password.

Password for the console

To limit the access via the console port (used for initial and on site configuration)use the following string of commands:

SW1(config)#line console 0

SW1(config-line)#password class

SW1(config-line)#login

This will set the password 'class' for the console line. Whenever someone connectto the port, they will be prompted for a password.

Password for network access

Since it's not always possible to make a physical connection to the switch, it mightbe a good idea to make it accessible via the network. The simplest way is to allowaccess via telnet, only prompting for a password:

SW1(config)#line vty 0 4

SW1(config-line)#password class

SW1(config-line)#login

The login command is default for the VTY and the command can be used todisable access via the network (no login).

Configuring a banner

A banner can be used to give information to some that connects to the system. Agood idea is to explain that the system is private, that you have to be authorized toaccess the

system and that any attempt to connect is logged. The banner text isstarted and ended with an escape character –are sure to select one that youwon't use in you banner text.

SW1(config)#banner login *

Enter TEXT message. End with the characters '*'.

PRIVATE SYSTEM!

SW1(config)#

VLAN, access and trunk ports

The switch can be used to create one big happy LAN. Just connect whatever needsnetwork access and let them communicate. Need more ports? Just add anotherswitch. As long as you want all your users connected to the same link you're done.If you on the other hand want to separate them from one another, maybe to gainsome lever of control on the IP level or just to make sure that two nodes can'tcommunicate with one another, you might want to create some sort of logical wallbetween them, forcing them to go through your router in order to communicate.

Enter the 'virtual local area network' (VLAN).

The process is fairly simple: number every VLAN with a unique ID (VID), tell theswitch what VID should be associates with a specific port and you're done. Nodesconnected to ports sharing VID can communicate, and nodes connected to portsassociated with different VID can't (at least not at the link layer). But how aboutconnecting switches together have more ports (or connecting to locations)? Eitheruse one link per VID (expensive) or use what Cisco calls a 'trunk' (other vendorsmight talk about 'tagging', from the act of inserting a VID in the frame when itpasses between the switches).

The 'trunk' is one type of port, used between switches (or between a switch and adevice that is VLAN aware and has the need to send traffic on more than one VLAN). We'll start by looking at VLAN and then move over to the *trunk port* andit's cousin, the *access port*.

Configuring VLAN

You can create, name and delete VLAN in the following way:

SW1(config)#vlan 10

SW1(config-vlan)#name LAN_A

As you can see from the example, we can both create and name the VLAN. Thesee the VLAN configuration of the switch:

SW1#show vlan brief

The output from the command can be found in *Table 1: VLAN output*. As can beseen in the output, all port are associated with VLAN 1, but there is a VLAN with VID 10 named LAN_A.

Configuring access ports

Ports used by non VLAN aware nodes, such as hosts or some routers are calledaccess ports. The access port is normally used to connect one node to the networkand the port is associated with a VLAN.

VLAN Name Status Ports

---- -------------------------------- --------- -------------------------------

1 default active Fa0/1, Fa0/2, Fa0/3, Fa0/4

Fa0/5, Fa0/6, Fa0/7, Fa0/8

Fa0/9, Fa0/10, Fa0/11, Fa0/12

Fa0/13, Fa0/14, Fa0/15, Fa0/16

Fa0/17, Fa0/18, Fa0/19, Fa0/20

Fa0/21, Fa0/22, Fa0/23, Fa0/24

Gig1/1, Gig1/2

10 LAN_A active

1002 fddi-default act/unsup

Output omitted

Table 1: VLAN output

The following command can be used to tell a switch that a interface FastEthernet

0/4 is an access port:

SW1(config)#interface FastEthernet 0/4

SW1(config-if)#switchport mode access

In order to make sure that there are no loops in the network, the switches run aprotocol called the spanning-tree protocol (STP). This protocol cycles everyinterface to a series of states when ts activated to make sure that the interfacewon't form a loop through other switches back to itself. Since the access port onlyshould connect to end-nodes (that is, nodes that are the source or destination oftraffic but never a transit node) – you can tell the switch to skip the stages andmove directly to a forwarding state using the command:

SW1(config-if)#spanning-tree portfast

If you think that this is to much configuration, search the Web for informationabout the switchport host command …

Associating the port with a VLAN

In order to tell the switch what VLAN an access port should be associated with,use the following command (in this case to associate it with VLAN 10):

SW1(config-if)#switchport access vlan 10

The association can be changed at any time by giving it the same command with adifferent VLAN.

Configuring trunk ports

Links connecting two switches are normally configured as trunks (if there aremore than one VLAN). The trunks use the IEEE 802.1Q standard for taggingframes in order for the receiving switch to know what VLAN a frame isassociated with. In order for a port to be a trunk port configure it with thefollowing command:

SW1(config-if)#switchport mode trunkOn switches with support for the Cisco trunking protocol ISL, you have to tell theswitch how the VLAN information is to be inserted into the frame. To use 802.1Q,

issue this command:

SW1 (config-if)#switchport trunk encapsulation dot1qThe 'native' VLAN

The norm on the trunk is that the VLAN is 'tagged', that is, the frame has a markerthat tells the receiver what VLAN the frame belongs to. One VLAN can be'untagged', that is, frames sent on that VLAN have no tagging inserted and anyframe that is untagged will be associated with that VLAN. The untagged, or native VLAN as Cisco calls it, can be used by clients connectedto a link that is configured as a trunk between two switches (let's say, for example,via a hub). The default native VLAN is the same as the default VLAN, that is, VLAN 1. To change the native VLAN, use the following command (in this casethe native VLAN is set to VID 50): SW1(config-if)#switchport trunk native vlan 50

Make sure to use the same native VLAN on both sides of the trunk.

SVI, IP address and telnet

The switch will need an interface with IP configuration in order to be accessiblevia the network. This interface is a virtual interface associated with a specific

VID. Some switches are able to have more than one active virtual interface (or

SVI) at a time but we'll be satisfied with using just one.

Configuring the SVI and IP address

Let's configure the IP address 10.0.0.10 with 24-bit subnetmask on a virtual

interface associated with VID 10: SW1(config)#interface vlan 10

SW1(config-if)#ipaddress 10.0.0.10 255.255.255.0

SW1(config-if)#no shutdown

The last command, the no shutdown, might not be needed as the SVI probablyactivates when created – but it's good practice to always make sure that theinterface is not in the 'shutdown' state since we don't like troubleshoot that kind ofsimple mistakes.

Revisiting telnet

If we've set a password on the VTY, we can now access the switch via telnet,pointing our client application at the IP address we just configured. But a VTYpassword is not enough, we also need the 'enable' password in order to get theaccess we want.

Working with the configuration

If we want to view the fruit of our labor, we can print the active configuration toour console using the show running-config command. Use 'space' or 'enter' tomove forward in the configuration and 'q' to not print any more.

If you want to save your configuration so its not lost when you reboot the switch,issue the command copy running-config startup-config and to view thesaved configuration, just type show startup-config.8/8

Self-Check 3	Written Test

Answer following question by saying “true” or “false”

1, **Service technician** must have to know electronic communication tools and equipment; and their function before become to be technician.

2, Drilling equipment is needed to make holes in building structure passages of conduits and wires.

3, Multimedia is not the field concerned with the computer controlled integration of text graphics, drawings, still and moving images.

4, cross-over refers to cables that have the pin assignments on each end of the cable.

Choose the best answer from the given options

Questions:

1) How many wires does the Ethernet wire have?

A) 4 B) 6 C) 8 D) 10

2) Which color is not one of the colors of the wires inthe cable?

A) Brown

B) Blue

C) Purple

D) Green

3) What do we use to remove the wire isolation?

A

B

C

D

Answer the following question!	
Note: **Satisfactory rating - 8 and 15 points**	**Unsatisfactory - below 8and 15points**
You can ask you teacher for the copy of the correct answers.	

Name_____

Answer sheet

1, True
2, True
3, False
4, False
1,C ,

2,C ,

3,C

LG19#	LO2: Guide/mentor service technicians

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Providing Service technician with clear instructions of work
- *Guiding /mentoring* and make stage checking
- Performing work documentation procedure

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Providing Service technician with clear instructions of work
- *Guid /mento* and make stage checking
- Perform work documentation procedure

Learning Instructions:

10. Read the specific objectives of this Learning Guide.
11. Follow the instructions described below.
12. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
13. Accomplish the “Self-checks” which are placed following all information sheets.
14. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).
15. If you earned a satisfactory evaluation proceed to “Operation sheets
16. Perform “the Learning activity performance test” which is placed following “Operation sheets” ,
17. If your performance is satisfactory proceed to the next learning guide,
18. If your performance is unsatisfactory, see your trainer for further instructions or go back to “Operation sheets”.

information Sheet 1	Guidance Of Technician Instruction

Under general supervision, troubleshoots, adjusts, installs, modifies, maintains and performs primary repair of home office and communications equipment, devices and systems; maintains records of work performed; and performs related duties as assigned.

Communications Technician Test is a job knowledge test designed to cover the major knowledge areas necessary to perform the job. This Guide contains strategies to use for taking tests and a study outline, which includes knowledge categories and study references.

Test Session

It is important that you follow the directions of the Test Administrator exactly. If you have any questions about the testing session, be sure to ask the Test Administrator before the testing begins. During testing, you may **NOT** leave the room, talk, smoke, eat, or drink. Since some tests take several hours, you should consider these factors before the test begins.

All cellular/mobile phones, pagers or other electronic equipment will NOT be allowed in the testing area.

A. Principles of communications

Understanding of electronic & electrical theory including knowledge of: electrical circuitry and related diagrams and symbols; power source symbols; electric coils, switches, transistors, fuses, amplifiers, diodes, and batteries; AC/DC current; grounding, resistance, capacitance, and harmonics including all related formulas; and logic trees.

Understanding of communication principles including knowledge of: analog and digital signals; noise (including how to measure it); cycle frequencies; dispersion, duplexing, amplitude; harmonics; bandwidth, distortion, interference, modulation, and feedback; oscillation; decibels; clocking/sync systems; attenuation; data rates (e.g., DS0, DS1 and DS3, etc..) and interfaces; OSI layers; gate symbols; squelch circuits;

Information sheet: 2	Electronic technician job description

What is an electronic technician?

Electronic technicians are responsible for set up, repair, and maintenance of electronic systems and equipment.

What does an electronic technician do?

Electronic technician duties include running performance analyses on electronic devices and reporting on results. They create prototypes based on complex manuals. They also troubleshoot and replace faulty materials.

Overall, electronic technician job responsibilities include:

- Installing and repairing electronic equipment
- Aligning and calibrating cables and wiring
- Monitoring and reporting on project progress

When building your own electronic technician job description, make sure to tailor these responsibilities and requirements to the position at hand.

Job brief

We are looking for an electronic technician to set up, maintain and repair electronic systems and devices. You'll test system performance, analyze and report on results.

This role requires hands-on experience using various hand and power tools to calibrate and align system components and circuitry. To succeed in this position, you should also be able to comprehend and follow complex technical manuals.

If you have good problem-solving skills, an eye for detail and good manual dexterity, we'd like to hear from you.

Responsibilities

- Set up electronic systems and devices
- Assemble and connect system components (e.g. cables)
- Build prototype models based on technical guidelines
- Monitor and report on project progress
- Estimate damage and calculate the cost of materials
- Test system functionality and analyze data
- Repair malfunctions in circuitry and other system structures
- Read and comprehend complex manuals and diagrams
- Update reports and maintain inventory
- Collaborate with engineers and other professionals on technical tasks
- Use various tools to build and repair systems (e.g. grinders)

Requirements

- Previous experience as electronic technician or similar role
- Hands-on experience with electronic testing and circuitry
- Familiarity working with various tools and equipment
- MS Office and diagnostic software (e.g. PC-based)
- Excellent physical condition and hand-eye coordination
- An associate's degree or apprenticeship as electronic technician
- Certification in engineering or electronics is required

Information Sheet #3	Measure is taken to Electronics Technician

Position Purpose:

The Electronics Technician is broadly responsible for fabrication, testing, troubleshooting, repairing, and modifying electronic developmental and production equipment, parts, components, and systems according to engineering instructions and customer specifications.

Essential Duties & Responsibilities:

- ❖ Performs complex technical functions in support of engineering activities such as set up, operation, maintenance, modification, circuit testing, calibration and troubleshooting of electronic or electromechanical components and systems, experimental design circuitry, prototype models or specialized test equipment.
- ❖ Works from schematics, diagrams, written and verbal instructions.
- ❖ conducts complex engineering tests to collect design data or assist in general research work.
- ❖ Diagnoses and isolates equipment and system malfunctions.
- ❖ Assists in the development of electronic equipment.
- ❖ Adjust and replace defective or improperly functioning circuitry and electronics components,using hand tools and soldering iron.
- ❖ Repairs or modifies cables and equipment returned by operational users or by personnel in the associated test and development areas.
- ❖ Assembles experimental circuitry or complete prototype model according to engineering instructions, technical manuals, and knowledge of electronic systems and components.

- Recommends changes in circuitry or installation specifications to simplify assembly and maintenance.
- sets up standard test apparatus or devises test equipment and circuitry to conduct functional, operational, environmental, and life tests to evaluate performance and reliability of prototype or production model.
- Analyzes and interprets test data.
- Adjusts, calibrates, aligns, and modifies circuitry and components and records effects on unit performance.
- Writes technical reports and develops charts, graphs, and schematics to describe and illustrate system operating characteristics, malfunctions, deviations from design specifications, and functional limitations for consideration by engineers in broader determinations affecting system design and procedures.
- Contribute to team effort by performing other tasks as appropriate and/or necessary.

Qualifications & Abilities:

- 2 Year Electronic Degree or 5+ years of demonstrated relevant experience. Competency in repairing electronic circuit testing, troubleshooting and manufacturing at component level.
- Ability to follow and read work instructions, prints, schematics, drawings, etc.
- Strong technical computer system (hardware & software) knowledge.
- Hands-on problem solving style.
- Strong verbal communication and writing skills.
- Self-motivated and self-directed, requiring minimal oversight to meet objectives and timelines.
- Proficiency with Microsoft Office tools.
- Able to pass a background check and drug screen.

Physical Requirements

- The physical demands described or implied within the Responsibilities section of this job description are representative of those that must be met to successfully perform the essential functions of this position.
- Ability to effectively interact and communicate with co-workers, customers, and suppliers.
- Sit and/or stand at workbenches/workstations, perform computer tasks and paperwork, sometimes for extended periods of time.
- Performing machine and facility maintenance-related activities.
- Performing shop floor / production-related activities.
- Ability to lift and carry up to 50 pounds

Self chek-1	Fill the blank space

1. Write three Overall job responsibilities of electronic technician.

   _____

2. Duties include running performance analyses on electronic devices and reporting on results.

_____

3. It has 8 positions and 8 contacts.

   _____

LO2: **Guide/mentor service technicians**

Self check -2	**Written test**

Self check two

1. Installing and repairing electronic equipment
2. Aligning and calibrating cables and wiring
3. Monitoring and reporting on project progress

L20 #	LO3: Document and provide feedback

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Monitoring Service technician's progress
- Verifying Work activities document
- Providing Assessment feedback to service technician

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Monitor Service technician's progress
- Verify Work activities document
- Provide Assessment feedback to service technician

Learning Instructions:

19. Read the specific objectives of this Learning Guide.
20. Follow the instructions described below.
21. Read the information written in the "Information Sheets". Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
22. Accomplish the "Self-checks" which are placed following all information sheets.
23. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).
24. If you earned a satisfactory evaluation proceed to "Operation sheets
25. Perform "the Learning activity performance test" which is placed following "Operation sheets" ,
26. If your performance is satisfactory proceed to the next learning guide,
27. If your performance is unsatisfactory, see your trainer for further instructions or go back to "Operation sheets".

Information Sheet	Guidance Of Technician Instruction

Reporting to the Home Office Electronics Technician Foreman, the Electronics Technician I repairs and maintains electronic, communication, audio-visual, and computer hardware systems and equipment in schools. This is an entry-level position so incumbents are not expected to be familiar with all equipment.

Working conditions require that the incumbent must possess a valid driver's license, must not be color blind, will work in crawl spaces and on scaffolding, must lift equipment weighing up to 27 kg (60 lbs) and is exposed to various live line voltage circuitry. Additionally, due to the nature of the job, incumbents must follow safety guidelines to protect themselves from harm and be cognizant of potential hazards to others. The position supports a variety of current and legacy technology.

POSITION DESCRIPTION ELECTRONICS TECHNICIAN I

ET1 - 1 Reads and interprets schematics, blueprints, service manuals and other reference material to facilitate the repair, maintenance, and diagnosis of electrical wiring, circuitry, hardware, and ancillary devices related to electronic, communication, audio-visual, theater sound and lighting and computer hardware systems and equipment

ET1 - 2 Designs, installs, troubleshoots, tests and maintains network wiring for new construction and renovations

ET1 - 3 Assists school based users in problem-solving to determine the source of a problem and initiate corrective action or perform repairs as necessary

ET1 - 4 Checks electronic systems work done under contract in new or renovated schools and reports any issues to the Electronics Foreman for remedy

ET1 - 5 Researches and recommends repair shops, sends equipment out for specialized repairs and trial tests equipment after repair

ET1 - 6 Orders parts for repairs, receives and ensures the accuracy and condition of orders; reports any discrepancies to the Foreman

ET1 - 7 Sets up and takes down sound equipment for school functions such as plays, concerts, fairs and sports events

ET1 - 8 Evaluates the cost-effectiveness of repairing equipment verses purchasing new equipment and makes recommendations to the Foreman

ET1 - 9 Provides information and assistance to District staff, members of the Parent Advisory Committee, vendors, repair technicians and contractors as required

ET1 - 10 Maintains the currency of service records and service manuals

ET1 - 11 Conducts orientations, informal training sessions and provides technical guidance and assistance to District staff on the use of various electronic, communication, audio-visual and computer hardware systems and equipment, as time permits

ET1 - 12 Draws and files “as-built” plans in consultation with the appropriate department(s)

ET1 - 13 Loads, transports and delivers equipment and materials to and from sites as required; equipment may weight up to 27 kgs (60 lbs)

ET1 - 14 Performs other assigned comparable or transient duties, which are within the area of knowledge and skills in this job description

QUALIFICATIONS ELECTRONICS TECHNICIAN I

EDUCATION	***TECHNICAL REQUIREMENTS*** Grade 12 or equivalent; and, Two (2) year post secondary Technician Certification in Electronic Engineering or equivalent
EXPERIENCE	***TECHNICAL REQUIREMENTS*** One (1) year related experience. As this is an entry position, specific experience in a position of a similar nature is not a requirement.
KNOWLEDGE	***TECHNICAL REQUIREMENTS*** Knowledge of the standards, practices, methods, materials, tools and equipment using for the repair and maintenance of District utilized electronics
SKILLS AND ABILITIES	***PROBLEM SOLVING REQUIREMENTS*** Strong mechanical, diagnostic and analytical skills in order to diagnose problems and repair equipment

	Ability to work with minimal supervision
WORKING CONDITIONS	***OCCUPATIONAL REQUIREMENTS*** Sufficient vision (must not be colour blind) and hearing to perform related job duties Able to perform related physical and mental activities Physically able to lift up to 27 kg (60 lbs) and operate related equipment, work in crawl spaces, work on scaffolding, in heat and with exposure to various live line voltage circuitry Working on active construction sites Possess a valid driver's license

Self chek-1	choose the best answer

4. The identification of hazards and its associated effects on the health is called _____

   A, Recognition C, Anticipation

   B, Evaluation D, Pure drinking water

5. **Service technician** must have to know

   A, electronic communication tools

   B, equipment

   C, tools and their function before become to be technician. D, all

6. Which one of the following is not multimedia element?

   A, audio C, graphics

   B, video D, animation E, none

Answer the following question!	
Note: **Satisfactory rating - 8 and 15 points**	**Unsatisfactory - below 8and 15points**
You can ask you teacher for the copy of the correct answers.	

Self check three

1. C
2. D
3. E