**Objectives**

1. Research information about software for a specific operating system (OS) environment. You will be assigned one of the operating systems form the list below. You will also be provided with a list of topics to investigate.
2. Organize your rough research information into a list of topics, sub-topics and facts. This process will involve identifying sub-topics, rearranging your rough research notes, and selecting (or highlighting) interesting facts.
3. Report a summary of your research in the form of a “concept map”. Use the PowerPoint template provided as a starting point. The concept map should only include the best and most interesting information from your organized research notes.
4. Your concept map can be created using: Smart Ideas, Prezi, PowerPoint or other similar applications.

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**Step 1 – Organized Research**

Research information about your assigned operating system (OS) environment.

* Guide your research according to the suggested topic list below
* Feel free to copy-and-paste as long as you keep track of your bibliographic references.
* Do not be too picky or concerned about formatting as you will organize this information later in step 2
* Select things that look interesting and don’t forget to include graphics images as well
* Upload your rough research notes to your repository when you are done.

Topic A – Application Software

Provide a summary of most important user application software targeted by this operating system and how it is similar to and deferent from standard PC software. Suggested sub-topics include:

* User (client) or network (server) applications
* Batch (run without user input) or interactive (user focused) processing
* Off-the-shelf (purchased) or custom developed applications
* Programming environment and languages supported

Rouse, Margaret, and Margaret Rouse. “What Is Windows NT? - Definition from WhatIs.com.” *SearchWindowsServer*, https://searchwindowsserver.techtarget.com/definition/Windows-NT.

* Windows NT is a Microsoft Windows personal computer operating system designed for users and businesses needing advanced capability
* Windows NT is two products: Microsoft NT Workstation and Microsoft NT Server
* It is also entirely 32 bit

Windows NT workstation

* The Workstation is designed for users, especially business users, who need faster performance and a system a little more fail-safe than Windows 95 and Windows 98
* Microsoft says that 32-bit applications run 20% faster on this system than on Windows 95

Windows NT server

* The Server is designed for business machines that need to provide services for network-attached computers
* The Server is required, together with an Internet server such as Microsoft's Internet Information Server (IIS), for a Windows system that plans to serve Web pages
* Microsoft claims that its NT servers are beginning to replace both NetWare and the various UNIX-based systems such as those of Sun Microsystems and Hewlett-Packard
* Windows NT server 5.0 was eventually renamed to Windows 200 and included features such as
* A fully-customizable administrative console that can be based on tasks rather than files, applications, or users
* A new file directory approach called Active Directory that lets the administrator and other users view every file and application in the network from a single point-of-view.
* Dynamic Domain Name Server (DNS), which replicates changes in the network using the Active Directory Services, the Dynamic Host Configuration Protocol (DHCP), and the Windows Internet Naming Service (WINS) whenever a client is reconfigured.
* The ability to create, extend, or mirror a disk volume without having to shut down the system and to back up data to a variety of magnetic and optical storage media.
* A Distributed File System (DFS) that lets users see a distributed set of files in a single file structure across departments, divisions, or an entire enterprise.
* Close integration with and support for Microsoft's Message Queue Server, Microsoft Transaction Server, and Internet Information Server (IIS).

<https://en.wikipedia.org/wiki/Windows_NT>

* Windows NT is written in C as well as C++. A bit is also written in assembly language. C is mostly used for kernel code while C++ is mostly used for user-mode code

<https://kb.iu.edu/d/abno>

* Contains the Windows 95 interface and features like the Start button, Taskbar, Explorer, Network Neighborhood, and Briefcase
* NetWare client and login script support
* Enhanced meta-file (EMF) spooling for improved network printing speed
* Support for 15 network protocols
* Peer-to-peer and FTP server capabilities
* Client software for both telnet and FTP services

Topic B – Hardware

Provide a summary of the hardware targeted by this operating system and how it is similar to and deferent from standard PC hardware. Suggested sub-topics include:

* Speed of processors / memory
* Capacity of memory / attached disks
* Is it designed for home / office / corporate data center / industrial use
* Is it designed for client / server / network use

<https://en.wikipedia.org/wiki/Windows_NT#Hardware_requirements>

|  |  |  |  |
| --- | --- | --- | --- |
| * **Windows NT minimum hardware requirements** | | | |
| * **Windows version** | * **CPU** | * **RAM** | * **Free disk space** |
| * NT 3.1 | * [i386](https://en.wikipedia.org/wiki/Intel_80386), 25 MHz | * 12 MB | * 90 MB |
| * NT 3.1 Advanced Server | * 16 MB |
| * NT 3.5 Workstation[[57]](https://en.wikipedia.org/wiki/Windows_NT#cite_note-KB132748-58) | * 12 MB |
| * NT 3.5 Server[[57]](https://en.wikipedia.org/wiki/Windows_NT#cite_note-KB132748-58) | * 16 MB |
| * NT 3.51 Workstation[[57]](https://en.wikipedia.org/wiki/Windows_NT#cite_note-KB132748-58) | * 12 MB |
| * NT 3.51 Server[[57]](https://en.wikipedia.org/wiki/Windows_NT#cite_note-KB132748-58) | * 16 MB |
| * NT 4.0 Workstation[[58]](https://en.wikipedia.org/wiki/Windows_NT#cite_note-KB126690-59) | * [i486](https://en.wikipedia.org/wiki/Intel_80486), 25 MHz | * 12 MB | * 124 MB |
| * NT 4.0 Server[[58]](https://en.wikipedia.org/wiki/Windows_NT#cite_note-KB126690-59) | * 16 MB |

<https://kb.iu.edu/d/abno>

Windows NT workstation 4.0 requirements

Intel based Systems

* 486/25MHz (or faster) or Pentium based system
* 12MB memory (RAM); 16MB recommended
* 110MB available hard disk space
* CD-ROM drive or access to a CD-ROM over a network
* VGA or higher resolution display adapter
* Microsoft mouse or compatible pointing device

RISC-based Systems

* Workstation with Alpha AXP, MIPS R4x00, or PowerPC processor
* 16MB of memory
* 110MB of available hard disk space
* CD-ROM drive or access to a CD-ROM over a network
* VGA or higher resolution display adapter
* Microsoft mouse or compatible pointing device

<https://www.webopedia.com/DidYouKnow/Hardware_Software/history_of_microsoft_windows_operating_system.html>

* There are 2 versions which include Windows NT server which is designed to act as a server in networks and windows NT workstation for standalone or client workstation
* It is used by businesses

Topic C – User Interface

Provide a summary of the user interface and input devices targeted by this operating system and how it is similar to and deferent from a standard PC. Suggested sub-topics include:

* Does it support a windowed environment, command line, or network users
* Does it support multiple users at a time or single users
* Does it support multiple applications or a single application at a time
* Does it get rebooted (powered on / off) or is it always on

<https://en.wikipedia.org/wiki/Multi-user_software>

* some multi-user operating systems such as Windows versions from the Windows NT family support simultaneous access by multiple users (for example, via Remote Desktop Connection) as well as the ability for a user to disconnect from a local session while leaving processes running (doing work on their behalf) while another user logs into and uses the system

<https://en.m.wikipedia.org/wiki/Windows_NT>

* default user interface: Graphical (windows shell)

32 bit platforms

* In order to prevent Intel x86-specific code from slipping into the operating system by developers used to developing on x86 chips, Windows NT 3.1 was initially developed using non-x86 development systems and then ported to the x86 architecture.

Topic D – Device Management

Provide a summary of the devices (disks, printers, etc.) and memory managed by this operating system and how it is similar to and deferent from a standard PC. Suggested sub-topics include:

* What types of disk drives and file systems does it support
* What type of input devices does it support
* What type of output devices does it support

<https://arstechnica.com/civis/viewtopic.php?f=17&t=948971>

Windows NT 4.0 Service Pack 4 (SP4) has a new Atapi.sys file that allows the drive to be formatted during setup of Windows NT. SP4's Atapi.sys can also access space beyond 8GB on these IDE drives.

Although Windows NT 4.0 can in theory support partitions of up to 16 exabytes in size using the NTFS file system, the maximum size of the system partition is limited to 7.8 gigabytes (GB)

Topic E – Security

Provide a summary of the security features provided by this operating system and how it is similar to and deferent from a standard PC. Suggested sub-topics include:

* What types of user accounts and user permissions does it support
* How does it protect against conflicts / interference between legitimate application processes
* How does it protect against malicious software
* How does it support software updates and security updates

<https://www.cs.mcgill.ca/~rwest/wikispeedia/wpcd/wp/a/Architecture_of_Windows_NT.htm>

* the primary authority for enforcing the security rules of the security integral subsystem . It determines whether an object or resource can be accessed, via the use of access control lists (ACLs), which are themselves made up of access control entries (ACEs). ACEs contain a security identifier (SID) and a list of operations that the ACE gives a select group of trustees — a user account, group account, or logon session — permission (allow, deny, or audit) to that resource.

Topic F – Network Connectivity

Provide a summary of the network connectivity provided by this operating system and how it is similar to and deferent from a standard PC. Suggested sub-topics include:

* Is the computer stand-alone or part of a larger network
* What type of network and internet connections does it provide
* Does it provide other services such as backup, firewall, etc.

**Step 2 – Concept Map**

Create a “concept map” as a final report of your organized research.

* Use the diagram in the introduction as a starting point.
* You should have six (6) first level topics from “Application Software”   
  to “Network Connectivity”
* Each first level topic should have at least three (3) sub-topics
* Each sub-topic should be supported by a number of facts / items of interest

Select the best and most interesting information from your organized research.

* Summarize and edit your information to fit on the concept map.

Upload your Research Notes and Concept Map to your GitHub Repository

* Your concept map can be created using: Smart Ideas, Prezi, PowerPoint or other   
  similar applications.
* Option1: Create and upload a PDF of your concept map
* Option2: Include a link to your Concept Map in your Student Questions
  + Make sure that your link is Sharable so Mr. Nestor can open your map

**Appendix A**

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| **Operating System** | **Student 1** | **Student 2** |
| Ubuntu  (Linux) |  |  |
| z/OS  (IBM) |  |  |
| Solaris  (Oracle) |  |  |
| HP-UX  (Hewlett Packard) |  |  |
| Windows NT  (Windows Server) |  |  |
| Red Hat Enterprise (IBM Summit) |  |  |
| QNX  (Blackberry) |  |  |
| VxWorks  (Wind River) |  |  |
| AOSP  (Android Alphabet) |  |  |
| Ubuntu  (Linux) |  |  |
| z/OS  (IBM) |  |  |
| Solaris  (Oracle) |  |  |
| HP-UX  (Hewlett Packard) |  |  |
| Windows NT  (Windows Server) |  |  |
| Red Hat Enterprise (IBM Summit) |  |  |
| QNX  (Blackberry) |  |  |
| VxWorks  (Wind River) |  |  |
| AOSP  (Android Alphabet) |  |  |
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