**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 if 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 like 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

z/OS is a [64-bit](https://en.wikipedia.org/wiki/64-bit_computing) [operating system](https://en.wikipedia.org/wiki/Operating_system) for [IBM mainframes](https://en.wikipedia.org/wiki/IBM_mainframe), produced by [IBM](https://en.wikipedia.org/wiki/IBM). It derives from and is the successor to [OS/390](https://en.wikipedia.org/wiki/OS/390), which in turn followed a string of [MVS](https://en.wikipedia.org/wiki/MVS) versions.  Like OS/390, z/OS combines a number of formerly separate, related products, some of which are still optional. z/OS offers the attributes of modern operating systems but also retains much of the functionality originating in the 1960s and each subsequent decade that is still found in daily use ([backward compatibility](https://en.wikipedia.org/wiki/Backward_compatibility) is one of z/OS's central design philosophies). z/OS was first introduced in October 2000.

Topic B – Hardware

Provide a summary of the hardware targeted by this operating system and how it is like 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?

Hardware

The system hardware consists of all the devices, controllers, and processors that constitute a mainframe environment.

Topic C – User Interface

Provide a summary of the user interface and input devices targeted by this operating system and how it is like 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

The most common interface for z/OS developers is TSO/E and its panel-driven interface, ISPF, using a 3270 terminal. Generally, developers use 3270 terminal emulators running on personal computers, rather than actual 3270 terminals. Emulators can provide developers with auxiliary functions, such as multiple sessions, and uploading and downloading code and data from the PC.

Program development on z/OS typically involves the use of a line editor to manipulate source code files, the use of batch jobs for compilation, and a variety of mechanisms for testing the code. Interactive debuggers, based on 3270 terminal functions, are available for common languages. This section introduces the tools and utilities for developing a simple program to run on z/OS.

Topic D – Device Management

Provide a summary of the devices (disks, printers, etc.) and memory managed by this operating system and how it is like 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?

Nearly all work in the system involves data input or data output. In a mainframe, the channel subsystem manages the use of I/O devices, such as disks, tapes, and printers.

The operating system must associate the data for a given task with a device, and manage file allocation, placement, monitoring, migration, backup, recall, recovery, and deletion.

These data management activities can be done either manually or using automated processes. When data management is automated, the system determines object placement, and automatically manages object backup, movement, space, and security

Topic E – Security

Provide a summary of the security features provided by this operating system and how it is like 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?

The z/OS Security Server is the primary tool that IBM recommends for managing security. Often the Security Server is called the Resource Access Control Facility (RACF). In the MVS environment, you can use RACF identify and verify users' authority to access data and to use system facilities. RACF protection can apply to a catalog and to individual VSAM data sets.

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.

IBM Z mainframes provide server networking with true processing power. Innovation in hardware and TCP/IP networking, such as on the new [IBM z15](https://www.ibm.com/marketplace/z15), reinforce the value of IBM Z to deliver:

* Agility to easily shareacross partitions.
* Security to improve trusted connectivity.
* Resiliency to deliver continuous availability.
* Scalability to maintain high performance.

**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 several 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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