**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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My Flow chart link.

<https://www.lucidchart.com/invitations/accept/c17e2b96-185f-4ae9-a89e-3cddbe60011b>

**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

QNX OS for Medical is a full-featured, multi-core operating system that meets the most demanding needs of today’s medical devices. With hundreds of millions of field usage hours in mission-critical applications, including devices and equipment for blood diagnostics, ultrasound imaging, infusion delivery, heart monitoring and resuscitation and robotic surgery, the microkernel-based RTOS has a proven record of reliability and pre-assessment to IEC 62304 compliance, which helps reduce the e‑ort in regulatory approval activities

<http://blackberry.qnx.com/en/software-solutions/embedded-software/industrial/qnx-sdk#embedded-systems>

The QNX® SDK for Apps and Media leverages open technologies for application development (HTML5, Qt, OpenGL ES) and allows device manufacturers to build compelling mobile-like interfaces with full multimedia capabilities, powered by secure, reliable, and field-proven QNX technologies.

Driven by the smartphone generation, embedded device manufacturers are being forced to build more compelling UIs. Building smartphone-like UIs requires many subsystems including multimedia, audio, video codecs and graphics subsystem that make it easy to control, render from multiple sources.

BlackBerry QNX provides a platform that brings the user experience of mobile devices to secure and reliable embedded systems.

There are some times where people employ others to make custom made apps with specific use for private use

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

<http://blackberry.qnx.com/en/software-solutions/connected-autonomous-vehicles#top>

Cars- Automotive OEMs and tier ones use BlackBerry QNX technology in the advanced driver assistance systems, digital instrument clusters, connectivity modules, hands-free systems, and infotainment systems that appear in car brands, including Audi, BMW, Ford, GM, Honda, Hyundai, Jaguar Land Rover, KIA, Maserati, Mercedes-Benz, Porsche, Toyota, and Volkswagen

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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

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* The application framework and platform services allow development teams to seamlessly combine multiple UI technologies onto a common UI. The QNX SDK for Apps and Media includes a fully ported, integrated, and optimized version of Qt that enables development teams to "Code Less. Create More".

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

<http://blackberry.qnx.com/en/software-solutions/embedded-software/rail-safety/qnx-os-for-safety#top>

Manages - QNX OS for Safety is a software solution that provides the reliable foundation necessary for building competitive automotive and mission-critical systems in a cost-effective and safe manner. QNX OS for Safety supports a wide-array of applications including, but not limited to:

* Control systems in autonomous vehicles
* ADAS systems
* Digital and hybrid instrument clusters
* High-speed train systems
* Industrial automation
* Energy generation
* Medical robotic surgery

With the incorporation of functional safety standards certification, QNX OS for Safety is the first safety-certified product in QNX’s 7.0 product family. It builds on QNX SDP 7.0, the most advanced and secure embedded OS developed for use in all safety and mission critical applications. The QNX OS for Safety is certified to ISO 26262 at ASIL D and IEC 61508 SIL3 by TÜV Rheinlander, an international leader in the sustained development of safety and quality

Building an automotive system compliant with ISO 26262 or an industrial automation or high-speed train control systems is complex and a significant undertaking. To help mitigate risk of non-compliance and reduce development and certification costs, BlackBerry QNX provides a reliable RTOS foundation that is pre-certified to the highest level of ISO 26262 – ASIL D and high SIL levels to IEC 61508.

<http://blackberry.qnx.com/en/software-solutions/embedded-software/industrial/qnx-hypervisor>

Hardware Support for Virtualization

The QNX Hypervisor makes full use of hardware virtualization capabilities to perform memory, CPU core, PCI configuration, and interrupt isolation between virtual machines. Assign hardware devices to specific virtual machines, thus hiding those devices from all other virtual machines. VirtIO-based block, console, and network as well as other para-virtualized drivers for device sharing are also supported.

The QNX Hypervisor supports the QNX Neutrino® OS, Linux, and Android operating systems, as well as other unmodified operating systems, RTOS, and real-time executives. Contact your Blackberry QNX Sales Representative for the latest list of supported OS.

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

<http://blackberry.qnx.com/en/professional-services/security-services#top>

With decades of proven experience in high assurance markets, BlackBerry QNX Security Services offer world-class security expertise, proven tools, trusted technology, and strong ecosystem support to industries including automotive, medical, robotics, industrial automation, defense and aerospace.

Our methodical approach to security, informed by decades of research and perfected through countless iterations to secure our own products, can help evaluate your software assets and make your deployed systems more secure.

* Assess Software Security Posture
* Plan and Implement Quantifiable Security Strategy
* Improve Level of Software Security Assurance

Systematic software analysis helps address vulnerabilities, mitigates the risk of non-adherence to security requirements, and reduces development and certification costs.

From penetration testing to comprehensive security assessments, BlackBerry QNX security experts can enhance security and software craftsmanship by targeting specific processes, specific software, or a company’s overall security posture.

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.

<https://blackberry.qnx.com/en/software-solutions/automotive/qnx-wireless-framework#top>

The QNX Wireless Framework provides a smartphone-grade feature set for embedded devices that need reliable access to wireless data connections and voice services. The framework provides dedicated resource managers to ensure fault-tolerant operation, handle dynamic behavior and deliver reliable and robust wireless services. The secure IoT and M2M connectivity offered by the QNX Wireless Framework is derived from best-in-class technology already deployed in millions of BlackBerry devices and supported by hundreds of carriers worldwide and has been proven in the most complex wireless environments.

The QNX Wireless Framework has the flexibility to support modems and wireless modules from numerous, market-leading vendors. The framework’s architecture allows developers to create future-proof applications that can support new cellular or Wi-Fi features without the cost of a completely new integration.

**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**

|  |  |  |
| --- | --- | --- |
| **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) | Trevhon |  |
| 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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