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**Course:** CSC235

**Title:** Assignment 1

**Question 1:**

UNIX is an operating system developed by ken Thompson, Dennis Ritchie amongst others, in the 1960s at the AT&T bell Lab. Originally designed for computer programmers, the OS has undergone several changes that has made it suitable for use by all and sundry.

At inception, UNIX was written in assembly language, but it was later re-written in C language, with some parts retained in the original assembly language.

Unix is a very powerful, portable and stable operating system. It supports multi-tasking, multi-user functionality.

**Components of UNIX OS**

Like other operating systems, UNIX has a kernel which is a program that controls the whole operating system. The kernel manages memory, start-up, time, resources, Input and output (IO), and acts as a bridge between the hardware and software components of the computers system.

UNIX is also composed of a shell which is a command line interpreter that acts as a bridge between the user and the UNIX OS. It is responsible for interpreting commands inputted by the user which are then executed.

UNIX has two major types of shells: bourne shell (named after the scientist who designed it) and C shell which was later added to the operating system.

It is also composed of various applications which performs specific tasks.

**UNIX Flavors**

There are many UNIX-like operating systems based on the UNIX philosophy that differ in their design, command and features. Examples of UNIX-like operating systems popularly referred to as “flavors” include AIX, Solaris, IRIX, Tru64, Linux, FreeBSD, OpenBSD, NetBSD, etc.

Linux is one of the most widely used UNIX-like operating system today.

**Linux**

Linux is an UNIX-like operating system which is free and open source. It was developed by Linus Torvalds and released on September 17, 1991. Widely used on desktops, laptops, web servers, mobile devices (android OS is based on the Linux kernel), Linux also runs on embedded systems. This is a testament to how portable it is.

The user interface of Linux comes in two forms. There is a command line interface (CLI) as well as a graphical user interface (GUI).

There are various distributions/variants of Linux which includes Ubuntu, Debian, Linux mint, elementary OS, Manjaro, etc. There are some proprietary distributions of Linux such as Red Hat enterprise Linux, Ubuntu enterprise, etc.

**Components of Linux**

* There are several components that work hand in hand for Linux to work smoothly on a system. These are:
* a bootloader that manages booting
* a kernel
* an init system that controls background service that are initiated or startup or log in to the desktop
* daemons - these are the background services controlled by the init system described above
* Graphical server that displays the output you see on your monitor
* a desktop environment in which users interact with. Linux has several desktop environments which can differ in respect to the variant of Linux installed. for example, Ubuntu by default has GNOME (GNU Network Object Model Environment) as its desktop environment, while
* applications that users can use to perform specific tasks.

**Question 2:**

Functional requirements in software development refers to clearly defined features that should be implemented by a product; what the product should do. It covers all the functionalities that a particular software can carry out.

Examples of function requirements includes:

* Whenever a user logins, the system must verify that the user is not a bot
* When a user creates a new account, a confirmation message must be sent to the user’s E-mail or phone number
* Whenever a user deletes an item, the system must ask to user to re-confirm their decision.

From the above examples, we can see that functional requirements deals with what a product must do(output) in respects to user inputs.

A documentation of the functional requirements of a software must be clear, concise, and well structured.

**Question 3**

The UNIX operating system is often preferred over windows and other operating systems sometimes, for reasons including but not limited to:

* Unix is more secure than windows
* Unix is more stable than windows
* Unix is very portable as it is written in C language.
* Many UNIX – like operating systems are free and open source

**Question 4**

Linux is called a scientist OS because many computer scientists and engineers prefer it because of its portability, security and it being a free and open source software.

**Question 5**

C is a general-purpose procedural programming language. As a procedural language, commands written In C language are executed in a sequential order.

**Question 6**

**DETAILED STRUCTURE OF C LANGUAGE**

A C program structure defines how to start writing a c program. It defines the structure a program should take while writing in C code.

A C program can be divided into 6 parts:

1. Documentation section
2. Link section
3. Definition section
4. Global declaration
5. Main () Function
6. Subprograms

* The documentation section begins a c program. In this section, the description of the program, approach used, profile of the programmer, date and time of initiating the project as well as the title of the project, is included here
* The link section contains all the header files needed by the program. these header files contain predefined library functions for various purposed. For example



contains predefined functions that performs input and output functionality in our code

* Definition section includes all the constants declared in our code using the define keyword



* Global declaration section contains all the global variables declaration in our program. global variables are those that can be accessed by any part of our code
* main () function is the section in which execution of a c program starts, and as such it is compulsory to include. inside the main function is where we declare local variables, write statements and expressions (statements that returns new value). Of all the sections of a c program, only the main () function is compulsory. If omitted, the program will not run.
* Subprograms sections contain all the user defined functions i.e., functions other than the c standard main () function. for example, a user can define a “calcAge” function to calculate the age of a person.

**Question 7**

To create a C program on a UNIX/Linux system, you need an IDE (e.g., visual studio) or text editor (e.g., VS code, Vim, Nano, Atom, etc.), which is basically a software you can type your C codes. Many of these can be downloaded from free online on their official websites.

Also, a compiler is needed to convert the source(written) code into machine language which the computer can understand. One of the most popular C compiler today is GCC (GNU Compiler Collection) and it is free to use.

GCC may already be installed in your system. To check, type the following commands



This should return the version of GCC if present.

Else, to install GCC easily, type the following commands in a command terminal

to install “build-essential” package which contains GCC.



Once GCC is installed, open your favorite text editor/ IDE. Create a file with a .c extension, and type your code into it.