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ASSIGNMENT ON LINUX AND C LANGUAGE

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1. UNIX OPERATING SYSTEM

UNIX is an operating system that allows users to run more than one application at the same time. It was initially created in the 1960s, and since then, it has been continuously improved. UNIX systems have a graphical user interface (GUI) that is similar to Microsoft Windows. Almost the entire UNIX operating system is written in the C programming language, which enables it to run on a variety of systems.

There are different variations of UNIX, but Linux is the most well-known and dominant of all the UNIX variants because of its free price and open-source code.

Linux is an open-source operating system that runs on a wide range of hardware, from smartphones to supercomputers. Despite being created to be similar to UNIX, it has evolved to run on a variety of hardware. Each Linux-based operating system (OS) consists of the Linux kernel and a collection of software packages.

It contains some essential parts, such as GNU tools, as well as additional tools that make up the functional operating system.

Linux is referred to as "open source" because anyone can use, analyze, tweak, and redistribute the source code; they can even sell copies of the modified code. However, this must be done in accordance with the license.

The world's most popular open-source software initiative is now Linux. Professional and amateur programmers and developers work on the Linux kernel on a daily basis, adding new features and fixing bugs.

2. SOFTWARE FUNCTIONAL REQUIREMENTS

In software engineering, functional requirements/specifications specify what a piece of software must be able to do and what its functions are. It is mainly used to define the purpose of the software. For example, a word processing application must allow users to create and edit documents; a social media application must allow users to send real-time chats or drop comments on posts, and a phone app must be able to call a number when the dial button is clicked. These are the functional specifications of the software.

3. WHY IS UNIX PREFERED AT SOME POINTS?

- a. Security - meaning that linux tends to be a safer system. Hence, one would not really need antivirus software. The reason is that linux is open source, so a number of developers look through the code to patch the vulnerabilities.
- b. No rebooting - In windows, installing or uninstalling an application or even upgrading the pc will require a reboot, but this is not the case for linux. One could even upgrade the entire OS without rebooting.
- c. Linux comes with a ton of pre-installed powerful programming tools like GREP, WGET and more that can help one improve programming workflow.
- d. Task automation - linux is almost built for automation of task.
- e. Performance - linux is not necessarily faster than any OS but it is lightweight and compatible with almost any machine.

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- f. Useful error message – instead of the usual vague “oops, something went wrong”, with linux you get a full read-out of the processes and useful information for finding solutions online.
- g. Customization – Users can customize a ton of things, also because it is open source.
- h. Ease of use.

4. WHY IS LINUX REFERRED TO AS THE SCIENTIST OS?

- a. Linux computation is quite fast
- b. Users would need to have quite the technical know-how due to linux's commands and softwares.
- c. It is also much simpler to upload code from a linux computer to the cloud, which runs on the linux operating system.
- d. Numerous tools are available in the Linux terminal to make coding easier.

5. WHAT TYPE OF PROGRAMMING LANGUAGE IS C?

The C programming language is a statically typed, low level programming language that has been widely used for creating both operating systems and applications. It is a compiled PL, meaning that all the syntax has to be correct for the file to be converted to an executable file.

6. DETAILED STRUCTURE OF C

A C program's structure can be roughly broken down into six sections, each serving a specific function. It makes the program simple to read, alter, document, and makes its formatting consistent. When writing the code, you must adhere to these structures.

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Section	Description
Documentation	consisting of the description of the program, the programmer's name, and the creation date. These are generally written in the form of comments.
Link	All header files are included in this section, which contains different functions from the libraries. A copy of these header files is inserted into your code before compilation.
Definition	includes the preprocessor directive, which contains symbolic constants. E.g.: #define allows us to use constants in our code. It replaces all the constants with their values in the code.
Global declaration	includes the declaration of global variables, function declarations, static global variables, and functions.
Main() Function	For every C program, the execution starts from the main() function. It is mandatory to include a main() function in every C program.
Subprograms	includes all user-defined functions (functions the user provides). They can contain the inbuilt functions and the function definitions declared in the Global Declaration section. These are called in the main() function

Source: scalar.com

For example, write a program to calculate our age.

Algorithm \Rightarrow Subtract the current year from the defined birth year.

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```
/**          //Documentation
 * file: age.c
 * author: you
 * description: program to find our age.
 */

#include <stdio.h>    //Link

#define BORN 2000    //Definition

int age(int current); //Global Declaration

int main(void)       //Main() Function
{
    int current = 2021;
    printf("Age: %d", age(current));
    return 0;
}

int age(int current) { //Subprograms
    return current - BORN;
}
```

Output:

```
Age: 21
```

Source: scalar.com

HOW TO CREATE A C PROGRAMMING FILE

LINUX

1. Open vim editor
2. Type in "vim file.c"

WINDOWS

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1. Open notepad
2. Save the file with a ".c" extension