Mount Kenya University

BIT 1102: Introduction to Computer Programming and Algorithm CAT1

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Question1:(a) Description of 3 control structures that make up a computer program.

1. Sequence - In sequence, program statements are executed in the sequence in which they appear in the proram

2. Selection or Descision - It gives a choice such that if an expression is related to a specific statement its executed, otherwise it is skipped.

3. Iteration or Looping - A group of statements in a program may have to be executed repeatedly until some condition is satisfied. This is known as looping.

Question1:(b) Explanation of a good program

1. Portability: This is the ability of a program or application to run on different platforms (OSs) with or without minimal changes

2. Readability: The program should be written in such a way that it makes other programmers or users to follow the logic of the program without much effort

Question1:(c) FlowChart and Pseudocode for KK Security Ltd Wages Calculation.

- Weekly wage = 5 days

- Daily wage = 8hrs@Ksh320/day for 5 days

- Saturday = 15% more than weekly wage

- Sunday = 20% more than weekly wage

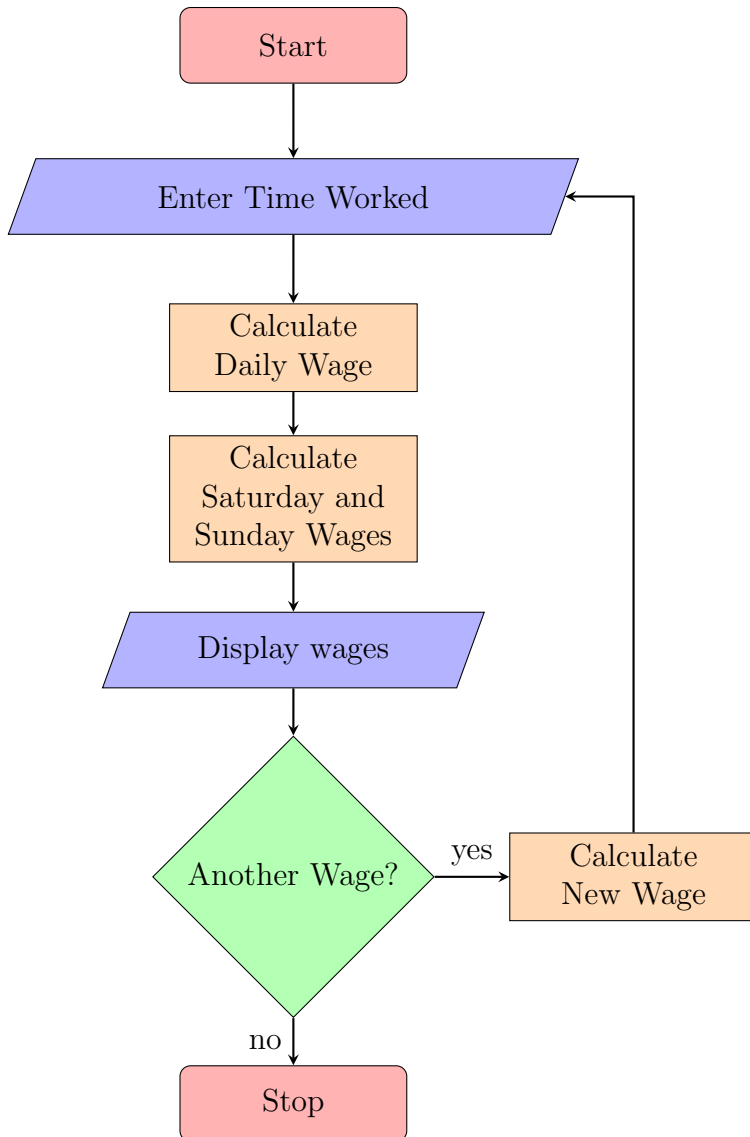**Pseudocode**
START
DAILY WAGE = 8HRSX320KSH/DAY = 2,360
SATURDAY WAGE = (15% OF DAILY WAGE) = 382.5
SATURDAY WAGE = (20% OF DAILY WAGE) = 510
TOTAL WAGE = KSH 3,485.5
STOP
Flowchart

```
                    ┌──────────────┐
                    │    Start     │
                    └──────┬───────┘
                           │
                           ▼
          ╱─────────────────────────────╲
          │      Enter Time Worked       │◄─────────┐
          ╲─────────────────────────────╱           │
                           │                         │
                           ▼                         │
                    ┌──────────────┐                 │
                    │  Calculate   │                 │
                    │  Daily Wage  │                 │
                    └──────┬───────┘                 │
                           ▼                         │
                    ┌──────────────┐                 │
                    │  Calculate   │                 │
                    │ Saturday and │                 │
                    │ Sunday Wages │                 │
                    └──────┬───────┘                 │
                           ▼                         │
          ╱─────────────────────────────╲           │
          │        Display wages         │           │
          ╲─────────────────────────────╱           │
                           │                         │
                           ▼                         │
                        ╱─────╲        yes    ┌──────────────┐
                      ╱         ╲─────────────►│  Calculate   │
                     │ Another   │             │  New Wage    │
                     │  Wage?    │             └──────────────┘
                      ╲         ╱
                        ╲─────╱
                           │
                        no │
                           ▼
                    ┌──────────────┐
                    │    Stop      │
                    └──────────────┘
```

Question 2(a) Difference between Pseudocode and Flowchart

A pseudo code is normaly a mixture of English like statements and some mathematical-like notations and select key words from a programming language.

A flowchart on the other hand, is a diagramatic representations of boxes and shapes to indicate the flow of logic which is also enhanced by arrows.

Question 2(b) Algorithm and Pseudocode

area = lenth x width

START

INPUT LENGTH

INPUT WIDTH

AREA = LENGTH X WIDTH

END

Question 2(c) Main Ojectives of Programming

1. Problem Solving - Programming is all about solving a problem. Programming is the process of developing a program to solve a problem.

2. Maintenance of a program. For an already developed program, programming can be applied to make the program better or remove errors.

3. Efficiency - Programming helps in providing code that makes our proceses simple, by enabling the computer to do more mudane and repetitive tasks.

4. Increase Knowledge - Programming is the process of developing software which in itself is a skill that enables us to make more products.

Question 3(a) Explanation of the characteristics of a good algorithim

1. Each step of an algorithim must be exact. An algorithim must be precise and unambigously described.

2. An algorithim must terminate. Since the purpose of an algorithim is to solve a problem, if the algorithim does not stop when executed, no output shall be gotten from it.

3. An algorithim must be effective. It must provide the correct answer to the problem.

Question 3(b) Explanation why I would choose a high level lanuage over other languages.

- High level languages are procedural oriented lanuages and are machine independent.

- High level lanuages are easier to learn than assembly languages

- High level languages provide better documentation

- High level languages are easer to maintain

- High level languages have an extensive vocabulary

Question 3(c): Structure of a C Program.

```c
#include <stdio.h>

/* This is a Block
 * comment */

int main()
{
    int i;

    // Thi is a line comment.
    printf("Hello world!");

    for (i = 0; i < N; i++)
    {
        printf("C is great for programmers!");
    }

    return 0;
}
```

Every C program contains a function called main main. This is the start point of the program.

The stdio.h allows the program to interact with the screen, keyboard and file system of your computer.

main() declares the start of the function, while the two curly brackets show the start and finish of the function mostly the body of the function.

Inside the main function is where the body of the program lies, and what is inside it shall be executed when the program is running.

printf is the printing function that will output text given to it.