



SIT102 Introduction to structured programming

Instruction: answer question one and any other two

Duration: 2 hours

Question one compulsory (30 marks)

- a. You are required to write a C program that accepts details of employee i.e. name, employee number, his/her basic salary, housing allowance and transport allowance. The program should output those details in a tabular format

Required

- i. Document the above business logic using a pseudocode **[7 marks]**
 - ii. Write a C program to implement the pseudocode above **[7 marks]**
- b. With reference to C programming language, differentiate between the following concepts. Use examples to support your answers.
- i. Variables and constants **[2 marks]**
 - ii. Keywords and identifiers **[2 marks]**
- c. Write a C program to accept details of **n** students from the keyboard. The details being accepted include student name, registration number, telephone number, unit name and unit marks for that unit. Based on the marks the student has scored in that unit, the program should set the grade appropriately. Use the following table to make your decisions **[12 marks]**

Marks	Grade	Remarks
70-100	A	Excellent
60-69	B	Good
50-59	C	Pass
40-49	D	Fair
0-39	F	Fail

The program should then display the output using the following format

enumber	Name	Tel no	Marks	Unit name	Grade	Remarks
0001	James	56	89	Programming	A	Excellent
0002	Eric	58	12	Database	F	Fail

Question two

- While designing programs, there are certain steps known as Program Development Life Cycle (PDLC) which the programmer has to adhere to. Critically discuss this steps indicating what each entails [12 marks]
- Write a C program for accepting n numbers from the keyboard. The program should then find the total number of even numbers entered, total number of odd numbers entered as well as the sum and average of both even and old numbers [8 marks]

Question three

- Critically explain any **two** factors you would consider while choosing a programming [4 marks]
- Write a C program which meets the following specifications. The program should display the following menu for the users

Convert temperature to

- Celsius
- Fahrenheit
- Exit

Depending on the selection the user makes from the keyboard, the program should execute the relevant function. If the user selects option one, the program should call a function known as *Celsius ()* which prompts the user to enter temperature in Fahrenheit then convert that temperature into Celsius.

If the user selects option two, the program should call a function known as *Fahrenheit ()* which prompts the user to enter temperature in Celsius then convert that temperature into Fahrenheit.

Option three should close the application. The menu should keep on iterating provided the user has selected option one or two. If any other option is selected, the entire application should exit [16 marks]

Question four

- a. With respect to C control structures discuss how decision control structures are implemented. Use examples to support your answers. **[9 marks]**
- b. With an example, explain how a C function can be called/invoked **[2 marks]**
- c. Write a C program to accept the details of n tenants. These details include name, gender, date of birth, telephone number and postal address. The details of n employees should be displayed on a tabular format **[9 marks]**

Question five

- a. The following data flow relates to the process of logging in to a system named “ESMS”. The system should prompt the user to enter password. If the password corresponds to the system password, then the system should display the message “access granted” and initialize the system. Else if the passwords do not match, the system should keep prompting the user to enter the password until the right password has been entered.

Required:

Document the above scenario using a flow chart **[5 marks]**

- b. Mr. Patil has fifteen employee whose wages are paid at the end of each week. The basic salary for the week is obtained by multiplying the number of hours worked in that week by the rate of pay. Each employee is entitled to a compulsory saving scheme of Ksh 500 per month; also each gets a daily lunch allowance of Ksh. 200 and is then added to basic pay to get the gross salary
 - i. Generate a suitable algorithm to solve the above problem **[5 marks]**
 - ii. Write a C program to implement the above pseudocode **[10 marks]**

*****End and good Luck*****