kasneb

CICT PART II SECTION 3

STRUCTURED PROGRAMMING

THURSDAY: 24 May 2018. **Time Allowed: 3 hours.**

Answer ALL questions. Marks allocated to each question are shown at the end of the question.

ALL programs written should be in C programming language.

QUESTION ONE

(a) List four popular integrated development environments (IDEs) that programmers could use to write C programs. (4 marks)

(b) Distinguish between "arrays" and "linked lists" based on the following:

(i) Definition. (2 marks)

(ii) Access. (2 marks)

(iii) Memory structure. (2 marks)

(c) Highlight four advantages of using algorithms in structured programming. (4 marks)

(d) Write a C program that accepts an input of type integer, checks whether the number is even or odd using bitwise operator, then displays the result. (6 marks)

(Total: 20 marks)

QUESTION TWO

(a) (i) Differentiate between "Lvalue" and "Rvalue" types of expressions as used in C programming. (4 marks)

(ii) Using an example, explain how you would assign value of Lvalue to Rvalue. (2 marks)

(b) The formula for calculating the compound interest of a loan is given below:

$$A = P\left(1+\frac{r}{100}\right)^t$$

Where

A is the compound amount
P is the principal amount
r is the interest rate
t is the time taken for the loan repayment

Required:
Write a C program that prompts a user to enter the principle amount, the rate and time taken then displays the calculated compound interest. (6 marks)

(c) Explain the meaning of the following terms as used in structured programming:

(i) Program specification. (2 marks)

(ii) Program release. (2 marks)

(d) (i) Describe the term "white space" as used in C programming language. (2 marks)

(ii) Highlight two examples of white space characters. (2 marks)

(Total: 20 marks)

QUESTION THREE

(a) Describe each of the following types of errors that could occur during compiling and running C programs:

(i) Linker errors. (2 marks)

(ii) Pre-processor errors. (2 marks)

(b) Outline the goals of the following programming approaches:

(i) Top-down approach. (2 marks)

(ii) Bottom-up approach. (2 marks)

(c) Justify why bottom-up approach is the more popular approach in programming. (2 marks)

(d) (i) Write a C program that prompts the user to enter the length and width of a rectangle, use a user defined function named "Areaofrectangle" to calculate the area, then displays the result. (6 marks)

(ii) Use the C program in (d) (i) above to distinguish between "actual argument" and "formal argument". (4 marks)

(Total: 20 marks)

QUESTION FOUR

(a) Study the program extract given below:

```
#include<stdio.h>
int main ( )
{
        int i;
        float f;
        double d;
        char c;

        printf ("size of int:%ld bytes\n", sizeof(i));
        printf ("size of float:%ld bytes\n", sizeof(f));
        printf ("size of double:%ld bytes\n", sizeof(d));
        printf ("size of char:%ld bytes\n", sizeof(c));

        return 0;
}
```

Required:
Write the output of the program. (4 marks)

(b) Describe the use of the following functions as used in file handling:

(i) Fputc( ). (2 marks)

(ii) Fputs( ). (2 marks)

(c) Outline six operations that could be performed on a linked list. (6 marks)

(d) Study the given program segment:

```
#include<stdio.h>
int main ( )
{
        int a, b;
        for (a = 1; a < = 10;a++)
        {
                for (b = 1; b< = 10; b++)
                {
                        printf(" %d \t", a*b);
                }
        }
        return 0;
}
```

Required:

(i) Write the output of the program segment. (2 marks)

(ii) Re-write the program segment using "while" loop. (4 marks)

(Total: 20 marks)

QUESTION FIVE

(a) Explain three limitations of smartphones. (6 marks)

(b) Re-write the following C program expression in a format that output the same result:

X* = y + 1; (2 marks)

(c) Highlight two differences between "recursion" and "iteration" as used in C programming. (4 marks)

(d) Write the output of the following C program statement:

printf ("%.2f", 33.668); (2 marks)

(e) Write a C program that accepts an integer from a user, reverses the digits of the number and outputs the result. (6 marks)

(Total: 20 marks)

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