



THE CATHOLIC UNIVERSITY OF EASTERN AFRICA

A. M. E. C. E. A

P.O. Box 62157

00200 Nairobi - KENYA

Telephone: 891601-6

Ext 1022/23/25

MAIN EXAMINATION

JANUARY – APRIL 2022

FACULTY OF SCIENCE

DEPARTMENT OF COMPUTER SCIENCE

REGULAR PROGRAMME

CMT 110/LIS208: PROGRAMMING METHODOLOGY (COMPUTER SCIENCE)

Date: APRIL 2022

Duration: 2 Hours

INSTRUCTIONS: Answer Question ONE and any TWO Questions

SECTION A

QUESTION ONE

Q1. a) Create an algorithm and a flowchart that will compute the sum of two numbers. If the sum is below or equal to twenty, two numbers will be entered again. If the sum is above 20, it will display the sum. **[5**

Marks]

b) Write a program that prompts the user to enter the year and month, and displays the number of days in the month. For example, if the user entered month 2 and year 2000, the program should display that February 2000 has 29 days. If the user entered month 3 and year 2005, the program should display that March 2005 has 31 days

[7 Marks]

c) In programming languages in general:

i) Differentiate between statically and dynamically-allocated variables. Without using the static keyword, give examples of both types of variable in the C language.

[5 Marks]

ii) What effect do the static and extern keywords have in C for both forms of variable? Explain **[3 marks]**

c) Using switch statement, write a C program that would personalize 5 sessions, assuming two different sessions are offered daily on morning and afternoon sessions.

[5 Marks]

d) Using suitable program example, explain any **TWO** types of variable **[5 Marks]**

Q2.

a) Draw a flowchart and write an algorithm to convert the length in metres to miles. **[7 Marks]**

b) Give **TWO** ways in which C templates differ from C++ Generics, other than mere syntactic differences. **[4 marks]**

c) Consider the following program, written to test whether the representation of int on a particular architecture uses two's complement or not.

```
#include<limits.h>
```

```
#include<stdio.h>
```

```
int main(void) {
```

```
printf("%d\n", (INT_MAX + 1) < 0);
```

```
return 0;
```

```
}
```

Explain what this program is permitted to output, and why. **[5 Marks]**

d) Explain the difference between 'x' and "x" when used as constants in C. Describe the memory representation of both values. **[4 Marks]**

Q3. a) Create an algorithm and a flowchart that will accept/read two numbers and then display the bigger number. **[5 Marks]**

b) Outline **THREE** rules when declaring variables in programming **[3 Marks]**

c) Citing program example, explain in details the use of the following control structures

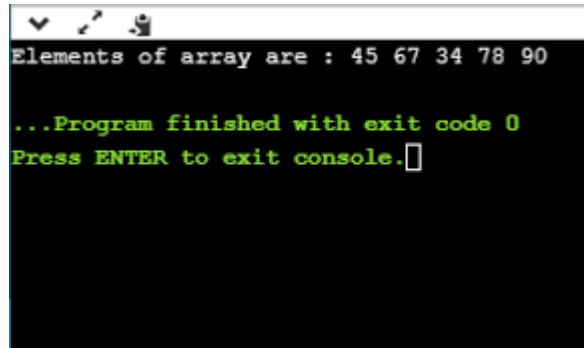
i) While loop

ii) for loop

[8 Marks]

d) Write a C program using an array that displays the following output on the screen.

[4 Marks]



```
Elements of array are : 45 67 34 78 90
...Program finished with exit code 0
Press ENTER to exit console.
```

Q4. a) Write a pseudocode and algorithm to determine a student's final grade and indicate whether it is pass/fail. The final grade is calculated as the average of four marks. A pass ranges from 0 to 50 marks

[5 Marks]

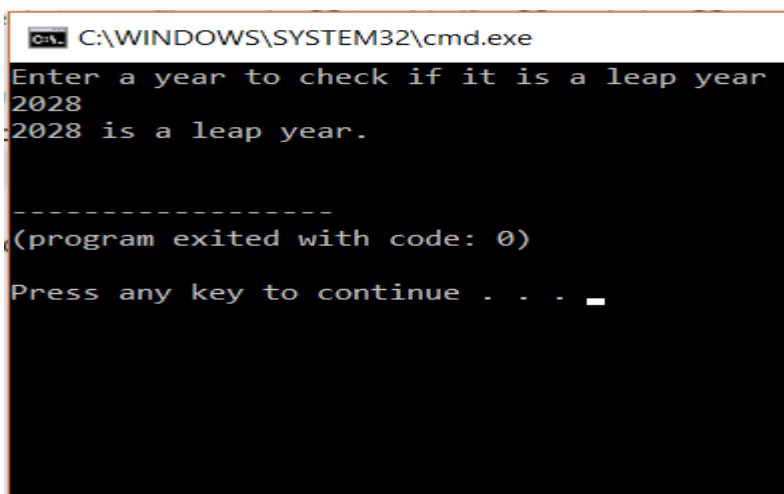
b) Write a C program which computes the sum of all odd numbers between 10 and 99 using do while loop. Ensure the program has your registration number and signature.

[7

marks]

c) Provide a snippet code that produces the following output:

[6 Marks]



```
C:\WINDOWS\SYSTEM32\cmd.exe
Enter a year to check if it is a leap year
2028
2028 is a leap year.
-----
(program exited with code: 0)
Press any key to continue . . . _
```

d) Differentiate between source code and object code

[2 Marks]

Q5.

a) Write a C program which computes the sum of all even numbers between 100 and 199 using for loop. **[7 marks]**

b) Write C program to store 5 values in an array then display then display the following output **[6 Marks]**

Output

```
c) Enter 5 integers: 1
d) -3
e) 34
f) 0
g) 3
h) Displaying integers: 1
i) -3
j) 34
k) 0
l) 3
```

c) Giving an examples of each, differentiate between program logic errors and syntax errors **[4 Marks]**

d) Briefly describe the **THREE** classifications of high level of programming language **[3 Marks]**

END