University of Asia Pacific

Department of Computer Science and Engineering

Program: B.Sc. in CSE

Final Examination **Fall-2022** 1st Year 2nd Semester

Course Code: CSE 103 Course Title: Structured Programming Credit: 3

Time: 3.00 Hour. Full Mark: 150

Instructions:

1. There are **Six (6)** Questions. Answer all of them. All questions are of equal value. Part marks are shown in the margins.
2. Non-programmable calculators are allowed.
3. Suppose you are answering the OR part of any question, please mention it as "Answer to the question no: <question no> (OR)".

   For example: Answer to the question no - 1(OR)

1. a. What is the difference between "H" and 'H' ? **[5]** CO1

   b. What is the output of the following program? **[5]** CO3

```
char s1[30] = "Den";
char s2[30] = "Marking";
strncat(s1, s2, 4);
printf("%s", s1);
```

   c. Write down a program that will take a word as input and determine whether the word is a palindrome or not. A palindrome is a word that reads the same way backward as forward. **[15]** CO5

   Examples of palindrome words: MOM, EYE, DAD, LEVEL etc.

OR

   a. What is the difference between a character array and a string? Explain both with a suitable example. **[5]** CO1

   b. What is the output of the following program? **[5]** CO3

```
char s1[30] = "Bad";
char s2[30] = "Good";
strncpy(s1, s2, 2);
printf("%s", s1);
```

   c. Write down a function that compares two strings and returns *1* if they are the same and *0* otherwise. **[15]** CO5

2. Write down a structure named "`employee`" that can store an employee's record having three attributes - **[25] CO4**


```
employeeID (integer)
salary (double) and
age (integer)
```

Using this structure take **N** employees' information as input where **N** will also be input to your program. Then find the maximum salary of the employees who are at least 40 years old. Also, calculate and show the size of the "`employee`" structure.

<div align="center">OR</div>

Write down a structure named "`star`" that can store a movie star's records having three attributes - **[25] CO4**

```
starID (integer)
name (string) and
age (integer)
```

Using this structure take **N** movie stars' information as input where **N** will also be input to your program. Then, find the age of the youngest movie star in the film industry. Also, calculate and show the size of the "`star`" structure.

3. a. What will be the value of **b, c,** and **d** after executing the following piece of codes? **[10] CO1**

```
int a [] = {3, 2, 7, 8, 6, 4};
int i = 2, b, c, d;
b = ++a[i];
c = a[i++];
d = a[i];
```

   b. Write down a program that counts and prints the number of odd numbers in a given array. The number of elements and all elements of the array will be input to your program. **[15] CO5**

```
Input:  Number of elements: 10
Input:  Input array elements: 5 9 30 15 40 0 7 11 16 100

Output: Number of odd numbers: 5
```


4. a. What is function prototype? Why they are needed? **[5] CO1**

   b. What is the purpose of header files in C? **[5] CO5**

   c. Write down a function that will take three integers as parameters and will return maximum of three. **[15] CO3**

5. a. Suppose we declared an array like below: **[5] CO1**

```
int a [3][4] = {{2, 3, 5, 1}, {7, 2, 9, 8}, {9, 1, 2, 6}};
```
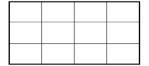
Can we omit both row size (3) and column size (4) while declaring the above array? Why or why not?

b. Suppose a 2D array has been created using the statement below: **[5] CO4**

```
int m [][4] = {{4, 1, 0, 2}, {-1, 2, 4}, {0, -1}};
```

Show the content of the array by filling out the following table:

c. Write a program that fills out an **N x M** two-dimensional array with integer inputs. Both **N** **[15] CO4** and **M** will also be input to your program. Your program should then take another integer **X** as input and will search **X** in the 2D array. If **X** is found then print first position of **X** found in the array. While printing first position print both row index and column index.

For the 2D array shown below, if **X** = 2 then your program should print "Found at Row index = 1 and Column index = 2". Print "Not Found" if **X** does not appear in the array.

5	5	8	8	7
1	0	2	4	6
7	4	4	5	6
9	3	9	4	2
7	1	3	1	8

6. a. Consider the following declaration: **[10] CO2**

```
int x[5] = {15, 6, 2, 98, 1};
int *p;
p = &x[0];
```

Suppose address of *x* is 500. What are the values of the followings?

i.   p+3

ii. *p+1

iii. *(p+1)

iv. *(p+1) - *p

v.   --(*p)

b. When we declare a pointer we usually use the following syntax: **[5] CO1**

```
datatype *variable_name;
```

Following are some examples:

```
char *c;
int *ip;
```

What does the data type in front of the declaration indicate?

c. Suppose the address of **a** is 300 and address of **b** is 400. Fill out the following table showing **[10] CO2** the value of the variables after executing each line of codes.

	a	b	a_p	b_p
`int a = 5, b = 10;`			-	-
`int *a_p = &a, *b_p = &b;`				
`a = b + *a_p;`				
`a_p = b_p;`				
`b = (*a_p) * (*b_p);`				
`*b_p = a / b;`				
`*a_p = a % b;`				