COMSATS University Islamabad, Abbottabad Campus
Department of Computer Science
Terminal Examination– Fall 2024

Class: BCS-2B
Subject: Programming Fundamentals
Total Time Allowed: 3Hrs
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Date: 16 January, 2025
Instructor: Dr. Mazhar Ali
Max Marks: 100
Registration# SP24-BCS-083

Question 1: Write the output of the following code. (CLO-1, Understanding)

[2.5+2.5+5+5 = 15 Marks]

(a)

```
#include<stdio.h>
int main(){
    int a=6;
    int b=a++;
    printf("%d\n",a);
    printf("%d\n",b);
    a=6;
    b=++a;
    printf("%d\n",a);
    printf("%d\n",b);
}
```

(b)

```
#include<stdio.h>
int main(){
    int a=6;
    int b=--a++;
    printf("%d\n",a);
    printf("%d\n",b);
}
```

(c)

```
#include <stdio.h>
void m(int x, int y[])
{
x = 3;
y[0] = 3;
}
int main()
{
int number = 0;
int numbers[1];
m(number, numbers);
printf("number is %d ", number);
printf(" and numbers[0] is %d \n" ,numbers[0]);
return 0;
}
```

(d)

```
#include <stdio.h>
void reverse(int list[], int size)
{
for (int i = 0; i < size / 2; i++)
{
int temp = list[i];
list[i] = list[size - 1 - i];
list[size - 1 - i] = temp;
}
}
int main()
{
int list[] = {1, 2, 3, 4, 5};
int size = 5;
reverse(list, size);
for (int i = 0; i < size; i++)
printf("%d\t", list[i]);
return 0;
}
```

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Question 2(a): Develop a function that returns the sum of all the elements in a specified column in a matrix using the following header:

```
double sumColumn(double Arr[], int rowSize, int columnIndex);
```

(CLO-2, Applying) **[15 Marks]**

Question 2(b): Create an integer array of ten elements, and initialize all the elements of array from user. Your program should find maximum and minimum elements of an array and also swap maximum and minimum element.

(CLO-2, Applying) **[15 Marks]**

Question 2(c): Develop a program that calculates power of a number using recursion.

(CLO-2, Applying) **[15 Marks]**

Question 3(a): What do you mean by structure in C? What are the advantages of structure in C? Define a structure complex with data member real and imaginary part. Then write a function that accept two complex structure instances and add those number and return the structure of same type.

(CLO-3, Applying) **[15 Marks]**

Question 3(b): Write a single statement to accomplish each of the following. Assume that each of these statements applies to the same program.

a. Open the file "**oldmast.dat**" for reading and assign the returned file pointer to **ofPtr**.
b. Open the file "**trans.dat**" for reading and assign the returned file pointer to **tfPtr**.
c. Open the file "**newmast.dat**" for writing (and creation) and assign the returned file pointer to **nfPtr**.
d. Read a record from the file "**oldmast.dat**". The record consists of integer **account**, string **name** and floating-point **currentBalance**.
e. Read a record from the file "trans.dat". The record consists of the integer **account** and floating-point **dollarAmount**.
f. Write a record to the file "newmast.dat". The record consists of the integer **account**, string **name** and floating-point **currentBalance**.

[15 Marks] (CLO-3, Applying)

Question 3(c): Implement a program that accept string data and write those strings to a file named "**data.txt**" character by character. Then read data from file and display on the standard output.

(CLO-3, Applying) **[10 Marks]**

```
int power(int a, int b) {
    if (b == 0) {
        return 1;
    }
    return a * power(a, b-1);
}
```