National University of Computer & Emerging Sciences, Karachi

Fall-2022 FAST School of Computing

Re-Midterm-2

18th November 2022, 10:00 am – 11:00am

Course Code:CS1002	**Course Name:** Programming Fundamentals
Instructor Name: Mr. M. Shahzad, Dr. Farooque, Dr. Muhammad Farrukh Shahid, Dr. M. Usama, Mr. Shahbaz, Mr. Musawar, Ms. Atiya, Ms. Aqsa, Ms. Sumaiyah	
Student Roll No:	**Section:**

Instructions:

- Return the question paper and make sure to keep it inside your answer sheet.
- Read each question completely before answering it. There are **three questions and two pages (front plus back)**.
- In case of any ambiguity, you may make assumption. However, your assumption should not contradict any statement in the question paper.
- Do not write anything on the question paper (except your ID and group).

Total Time: 1 Hour **Max Points**: 60

Question#1: Give the output when these programs are executed: **[12 points, CLO3, 15 mins]**

1.

```
#include<stdio.h>
int main()
{
int i = 1;
do
{
  while(i)
   i--;
   for(i++; 0; i++);
     break;
}while(1);

printf("%d", i);
return 0;
}
```

2.

```
#include<stdio.h>
int main()
{

alpha[0] = 5;
for (count = 1; count < 5; count++)
{
alpha[count] = 5 * count + 10;
alpha[count - 1] = alpha[count] -
4;
}
for (count = 0; count < 5;
count++){
printf("%d", alpha[count] );
}
}
```

3.

```
#include<stdio.h>

int main()
{
    int a[5] = {5, 1, 15, 20, 25};
    int i, j, m;
    i = ++a[1];
    j = a[1]++;
    m = a[i++];
    printf("%d, %d, %d", i, j, m);
    return 0;
}
```

4.

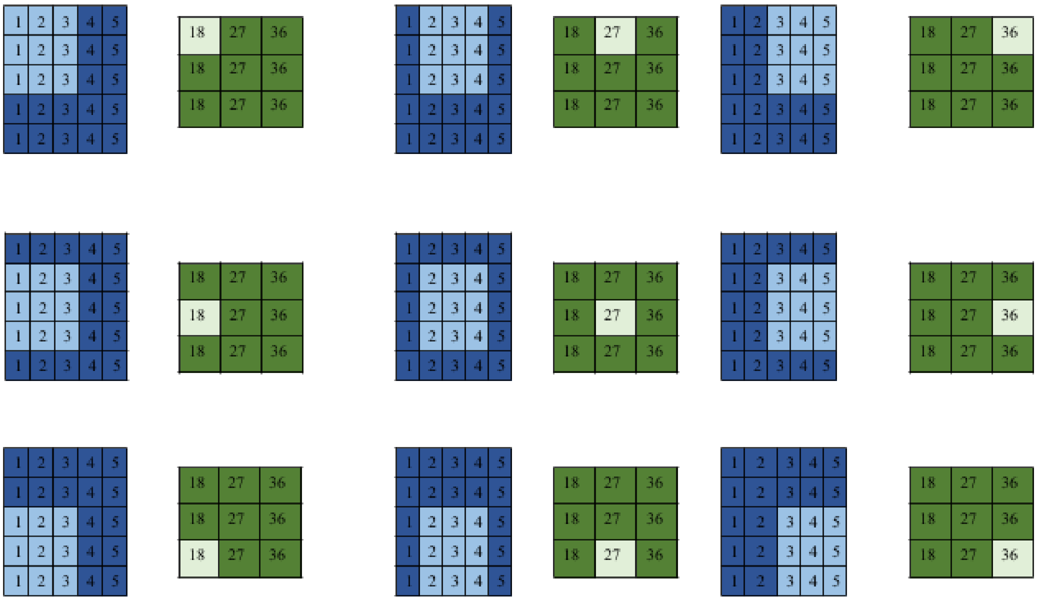
```
#include<stdio.h>
int main()
{
   int i = 0;
   while(++i)
   {
         i == --i?i = 0:i = 1;
    }
   printf("%d", i);
   return 0;
}
```

Question#2: [16 points, CLO2, 20 mins]

Scenario: A **convolution** is a type of matrix operation, consisting of a kernel, a small matrix of weights, that slides over input data performing element-wise multiplication with the part of the input it is on, then summing the results into an output.

You need to scan the arrays **int input [5][5]** and **int filter [3][3]** and declare the array **int result [3][3]** to store the result of convolution.

The example of convolution operation is mentioned below. Note in this case the **filter** is initialized with 1. Furthermore, **green matrix** represents result, **blue matrix** represents input and **light blue** matrix represents filter (which keeps on moving).



Question#3: [32 points, CLO2, 25 mins]

Yasir and ***Binish*** are playing a game, where ***yellow*** or ***blue*** pieces are represented by a colour string. The game rules are as follows:

- ***Yasir*** moves first then they take alternate turns
- With each move, ***Yasir*** may remove a ***yellow*** piece that has adjacent ***yellow*** pieces on both sides
- Likewise, with each move, ***Binish*** may remove any ***blue*** piece that has adjacent ***blue*** pieces on both sides.
- After a piece is remove the string is reduce in size by one piece. For example, removing ***'B'*** from ***"ABC"*** results in ***"AC"***.
- When a player can no longer move, they have lost the game.

Example: Colours = ***"yyybbbbyyy"***
Yasir removes the piece ***'y'*** at index 1, colours = ***"yybbbbyyy"***
Binish removes the piece ***'b'*** at index 3, colours = ***"yybbbyyy"***
Yasir removes the piece ***'y'*** at index 6, colours = ***"yybbbyy"***
Binish removes the piece ***'b'*** from index 3, colours = ***"yybbyy"***
Yasir has no other moves, so ***Binish*** wins. Display ***Binish***!
Determine who wins if ***Yasir*** and ***Binish*** both play with optimum skill. Display the string '***Yasir***' or '***Binish***'.

BEST OF LUCK!