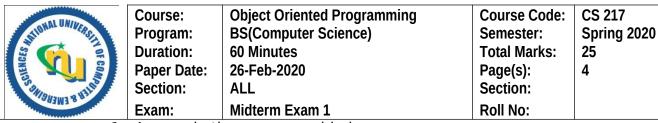
National University of Computer and Emerging Sciences, Lahore Campus



Instruction/Notes1. Answer in the space provided

- You can ask for rough sheets but they will not be graded or marked
- 3. In case of confusion or ambiguity make a reasonable assumption.
- 4. Questions are not allowed.

Question 1: (5+5 marks)

Write output against each of the following in proper format? (Write **G** for garbage value, if any).

Part(A) (5 marks)

Roll Number: Section:

```
int main()
                                           OUTPUT:
{
                                           3,4,5,
      int size = 3;
                                           1,2,3,
      int ** a = new int *[size];
                                           2,3,4,
                                          Press any key to continue .
      for (int i = 0; i < size; i++)
             *a = new int[size];
             for (int j = 0; j < size; j +
+){
                    *(*a + i) = i + i + i
1;
             int index = (i + 1) \%
size;
             Interchange(*a,
a[index]);
      print(a, size);
      for (int i = 0; i < size; i++)
             delete[] a[i];
      delete[] a;
      a =nullptr;
return 0;
```

Part(B) (5 marks)

```
class A {
                                  void main() {
      char c1, c2;
                                        A a1;
public:
                                        A a2('F');
     A()
                                        cout << endl;
             c1 = 'z';
                                        cout << a1.getC1() << "," <<
           cout << c2 << ",";
                                  a2.getC2() << endl;
      }
                                        a1.setC1('O');
      A(char c)
                                        a2.swap();
                     c2 = 'A':
               cout << c <<
",";
                                        cout << a1.getC1() << "," <<
                                        a1.getC2() << endl;
                                        cout << a2.getC1() << "," <<
      void setC1(char n1) { c1
                                  a2.getC2() << endl;
= n1; }
      void setC2(char n2) { c2
                                        a1.swap();
= n2; }
                                        cout << a1.getC1() << "," <<
      void swap() { c1 = c2; c2
                                  a1.getC2() << endl;
= c1;  }
                                  }
      char getC1() { return
```

Question 2: (3+3+9 marks)

Press any key to continue . . .

You have to implement the C++ code of a function **splitArray**, that takes a dynamic square two-dimensional array **Arr** and its size **n** as parameters. Array **Arr** comprises of random integer numbers. The function **splitArray** will split array **Arr** in two sub arrays and return them along their sizes. The first sub array will contain all prime numbers of original **Arr** and second sub array will contain all non-prime numbers. Sample run of **splitArray** is shown below:

Input Arr:		Sub A	rrays retu	rned by sp	litArray:	
Enter a Number greater than 1 Original Array: 38 19 38 37	l: 5 55	Sub A 19 97 53 97	rray of 37 37	Primes:		
97 65 85 50	12	7,				
53 0 42 81 21 45 85 97	37 80	Sub A	rray of 38	Non-Prim 55	ies:	
76 91 55 6	57	65 0	85 42	50 81	12	
		21 76	45 91	85 55	80 6	57

Note:

- The Original array Arr should remain intact (there should be no change in its size and data) after function call.
- The function bool isPrime (int n), which returns true if a number is prime and false otherwise is already implemented. So you do not need to implement it.
- Your code should be free of dangling pointers and memory leak.

Part (A) Write down the function header of splitArray.
(3 marks)

```
void splitArray(int ** Arr, int n, int **&s1, int &n1, int *&col1, int **&s2, int &n2, int
*&col2);
```

Roll Number:	Section:

Part (B) Write the C++ code of a generic function **deallocateArray**, which can deallocate memory of 2d arrays of any size. This function will be called from main function **three** times for deallocation of original array *Arr*, and two sub arrays which are created and returned by function **splitArray**. (3 marks)

Part (C) Write the C++ code of function splitArray. (9 marks)

```
Section: _____
// for storage of column sizes of each row
col1 = new int[n1];
col2 = new int[n2];
// calculate column sizes of both arrays
int i1 = 0, i2 = 0;
for (int i = 0; i < n; i++){
      int pcount = 0, npcount = 0;
      for (int j = 0; j < n; j++){
             if (is_prime(Arr[i][j]))
                   pcount++;
             else
                   npcount++;
      if (pcount > 0) coll[i1++] = pcount;
      if (npcount > 0) col2[i2++] = npcount;
}
//create new arrays
s1 = new int*[n1];
for (int i1 = 0; i1 < n1; i1++)
      s1[i1] = new int[col1[i1]];
s2 = new int*[n2];
for (int i2 = 0; i2 < n2; i2++)</pre>
      s2[i2] = new int[col2[i2]];
//copy data in splited arrays
for (int i = 0, i1 = 0, i2 = 0; i < n; i++, i1++, i2++){
      for (int j = 0, c1 = 0, c2 = 0; j < n; j++){
             if (is_prime(Arr[i][j])){
                   if (i1 < n1 && c1 < col1[i1]) s1[i1][c1++] = Arr[i][j];</pre>
             else{
                   if (i2 < n2 && c2 < col2[i2]) s2[i2][c2++] = Arr[i][j];</pre>
             }
      }
}
```

Roll Number: