Institute of Business Administration Karachi
Leadership and Ideas for Tomorrow

CSE141 Introduction to Programming (Fall'18)

Max Marks: 50

Midterm Examination

IBA FCS Faculty of Computer Science

Time Allowed: 2 hours

Answer the questions in the spaces provided on the question sheets.
Please give clear and rigorous answers.
Be to the point. Show your work.

Name: _____ **ERP:** _____

Question:	Expressions	Tracing	Redirection & Piping	Arrays	Programming	Total
Points:	10	10	5	5	20	50
Marks:						

Question 1: Expressions ..... *10 marks*

For each of the C++ expressions below, write down the type of the expression and its value. If the expression causes a syntax or run-time error, write an `X` in both boxes.

Expression	Type	Value
`"1"+ 3 * 2`	`String`	`"16"`
`(12 + 3)/ 4 * 2`	**`int`**	6
`tointeger("16")*2`	**`int`**	32
`(5 > 10)|| (20 > 15)`	**`boolean`**	**`true`**
`(int)3.14 / (double)6`	**`double`**	0.5
`1.2e6 % 1.2e5`	**`double`**	0.0
`1 <= 2 < 5`	X	X

`min(1.2e3, 1.2e4, 1.235)`	X	X
`(`**`false`** `==` **`false`**`)&&` **`true`**	**`boolean`**	**`true`**
`!!!!!`**`false`**	**`boolean`**	**`true`**

Question 2: Tracing ..... *10 marks*

Either indicate any bug in the following programs (Compilation error, Runtime error, Infinite loop). Or write output of the program if it contains no error.

(a)

```
char a = 'A', d = 'D';
char grade = 'B';
switch(grade) {
 case a:
 case 'B': std::cout<<"great";
 case 'C': std::cout<<"good"); break;
 case d:
 case 'F': std::cout<<"not good";
}
```

Solution:

(b)

```
int i, j;
for (i = 0, j = 0; i < 10; i++)
    j += i;
std::cout<<i + " " + j;
```

Solution:

(c)

```
do {
    int y = 1;
    cout<<y++ + " ";
} while(y <= 10);
```

Solution:

(d)

```
boolean A = false;
boolean B = true;
for (int i = 0; i < 100; i++) {
    boolean temp = A;
    A = B;
    B = temp;
}
std::cout<<A;
```

Solution:

(e)

```
boolean C = false;
for (boolean D = true; C == D;)
    D = false;
std::cout<<D;
```

Solution:

Question 4: Arrays ..... *5 marks*

Consider the following program (the numbers on the left are line numbers for reference only and are not part of the code):

```
1 void main() {
2    int N = 10;
3    int UNKNOWN = 2;
4    int P = 1;
5    int NONP = 0;
6
7    int a[N];
8
9    for (int j = 2; j < N; j++)
10      a[j] = UNKNOWN;
11
12   for (int i = 2; i < N; i++) {
13      if (a[i] == UNKNOWN) {
14         a[i] = P;
15         std::cout<<i + " ";
16         for(int j = i; i * j < N; j++)
17            a[i * j] = NONP;
18      }
19   }
20 }
```

(a) What will the contents of the `a` array be after the loop at lines 9-10 is complete?

Solution:

(b) What will the program print?

Solution:

Question 5: Programming ..... *20 marks*

(a) [5 marks] Write a program `printRange.cpp` that accepts two integers as command-line arguments and prints the sequence of numbers between the two arguments, enclosed in square brackets. Print an increasing sequence if the first argument is smaller than the second; otherwise, print a decreasing sequence. If the two numbers are the same, that number should be printed between square brackets. Here are some sample calls to `printRange`:

input	Output
`j 2 7`	`[2, 3, 4, 5, 6, 7]`
`19 11`	`[19, 18, 17, 16, 15, 14, 13, 12, 11]`
`5 5`	`[5]`

Solution:

(b) [5 marks] Write a program that take input elements of an array from standard-input and copy even and odd elements of that array in two separate arrays containing only even or odd elements and print them. Here is a sample run of the program:

```
Enter size of the array: 10
Enter elements in the array: 0 1 2 3 4 5 6 7 8 9
Even array: 0 2 4 6 8
Odd array: 1 3 5 7 9
```

Solution:

(c) [5 marks] Write a program `EvenDigits.java` that take an integer from command line and prints sum of its even digits. E.g, sum of even digits of `23617` is `2 + 6 = 8`.

Solution:

(d) [5 marks] Write a program that randomly fills in 0s and 1s into a 5-by-5 matrix, prints the matrix, and finds the first row with the most 1s. Here is a sample output of the program:

```
01101
01011
10010
11111
00101
The largest row index: 3
```