

The exam is taken without any material beside writing material, and in silence. Answer the following questions and problems, trying to be as clear and as accurate as possible. You can write on the back of your test, in which case you are asked to indicate it clearly. This exam has 5 problems, for a total of 200 points (+20 points).

Problem 1

Consider the code below:

65 (+10) p.

```
1  class Printer{
2      private string location = "Unknown";    // Where the printer is located.
3      private decimal blackLevel = 1;         // Level of black ink, in percent.
4      private decimal colorLevel = 1;         // Level of color ink, in percent.
5
6      public void SetLocation(string locationP)
7      {
8          location = locationP;
9      }
10 }
```

You are asked to write statements that would go in the Main method, in the Printer class, or to draw the UML diagram.

(Main method) Write a statement that would create a Printer object called homePrinter.

(Printer class) Write a getter (“accessor”) for the location attribute.

(Main method) Write a statement that would display at the screen the location of the homePrinter object you created previously. What would be displayed?

(Printer class) Write a setter (“mutator”) for the `blackLevel` attribute that takes one **decimal**. The argument should be assigned to the `blackLevel` attribute only if it is between 0 and 1 (both included), otherwise the attribute should get the value 0.

(UML Diagram) Draw the UML diagram for the `Printer` class, including the methods you just added.

(Printer class) Write a constructor that takes three arguments (a **string** and two **decimals**) for the `Printer` class. Your constructor should be such that if one of the **decimal** is not between 0 and 1 (both included), then 0 get assigned to both **decimal** attributes.

(Main method) The statement that creates the `homePrinter` object would not compile after you have added this constructor. Why?

(Main method) Write a statement that would create a `Printer` object called `officePrinter` using the constructor you just added (simply make up the values).

(Printer class) Write a `ToString` for the `Printer` class. It should display the location and the level of black and color ink. *(Bonus)* If you have time, make it so that the level of ink would be displayed graphically: for instance, if the printer has 32% of black ink left, display “Black: □ □ □ □ □ □ ■ ■ ■” (you can assume that “□” and “■” are characters that you can type and use as any other in `strings`.)

(Main method) Write a statement that would use the `ToString` method from the `Printer` class you just added to display information about the `officePrinter` object.

Problem 2

Consider the following code, and fill the table below to either indicate what will be displayed, or which values would cause this number to be displayed.

_____/25 p.

```

1  int x;
2  char y;
3  decimal z;
4  // x, y and z are given values
5
6  if(x < 0 && y == 'a'){
7      Console.WriteLine("1");
8  }
9  else if (z % 2 == 0){
10     Console.WriteLine("2");
11 }
12 else if (y == 'm' || y == 'n'){
13     Console.WriteLine("3");
14 }
15 else if (x != 0 && z != 0){
16     Console.WriteLine("4");
17 }
18 else{
19     Console.WriteLine("5");
20 }

```

x	y	z	Displays
-1	'p'	20.4M	
-1	'a'	-4	
0	'm'	10.2M	
1	'n'	2	
-1	'b'	211	
1	'n'	-12.5M	
0	'a'	0	
1	'm'	15	
			5

Problem 3

Write a program that declares an `int` variable called “areaCode” and asks the user to enter their area code. As long as the user enters something that is not a number, or a number strictly below 200 or over 999, your program should ask again. (Bonus) If you have time, after three failed attempts, your program should assign 0 to areaCode and move on.

_____/45 (+10) p.

_____/65 p.

- Write a statement that would create an array of `int` of size 100.
- Write a series of statements that would ask the user to enter a value for each cell in the array (no need to perform user-input validation).
- Write a series of statements that would ask the user to enter a value, and then displays “It is in your array” if that value is in the array.

d) Write a series of statements that would display the sum of the values in the array.

e) Write a series of statements that would display the product of all the non-zero values in the array.

f) Write a series of statements that would display the smallest index of the greatest value in the array.