

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. Take the time to read carefully the statements before trying to answer them. You can write on the back of your test, in which case you're asked to indicate it clearly. This exam has 5 problems, for a total of 100 points.

Problem 1

Assume you are given two variables that have already been initialized:

_____/20 p.

- a **char** variable `iniLName`, containing the (capitalized) first letter of the last name of a passenger,
- a **decimal** variable `pricePaid`, containing the price of the ticket paid by the passenger.

To determine where the passenger will be seated, we use the following rules:

Passengers who paid strictly more than \$600.00 go in the first class,

Passengers who paid \$600.00 or less and whose last names begin with A through G go in the second class, left-side aisle,

Passengers who paid \$600.00 or less and whose last names begin with H through Z go in the second class, right-side aisle,

Write a piece of code that displays at the screen where the passenger whose data is stored in the `iniLName` and `pricePaid` variables should seat.

Problem 2

Read the following code, and answer the following two questions:

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```
switch (citizenship) {
    case ("US"):
    case ("CA"):
        if (income > 100)
            if (age < 21) Console.WriteLine("Go to office A.");
            else if (age < 60) Console.WriteLine("Go to office B.");
            else Console.WriteLine("Go to office C.");
        else
            Console.WriteLine("Go to office D.");
    break;
    case ("DE"):
        if (income > 200 && age > 18) Console.WriteLine("Go to office E.");
        else Console.WriteLine("Go to office F.");
    break;
    case ("FR"):
        if (age <= 18 || income <= 10) Console.WriteLine("Go to office G.");
        else if (income > 200) Console.WriteLine("Go to office H.");
    break;
    default:
        if (age > 21) Console.WriteLine("Go to office I.");
        else Console.WriteLine("Go to office J.");
    break;
}
```

1. Depending on the values of age, citizenship and income, determine what would be displayed:

age	citizenship	income	"Go to office..."
18	"CA"	80	
21	"UK"	150	
18	"US"	120	
25	"FR"	210	
25	"DE"	210	
23	"AZ"	150	
21	"FR"	8	
18	"DE"	200	
62	"CA"	120	

2. Give a set of ("legal") values for which nothing would be displayed.

Problem 3

Write a program that asks the user to enter a whole number. As long as the number entered by the user is not 0, you should and ask for another number. As soon as the number entered is 0, display the product of all the values entered by the user. You don't need to perform user-input validation. Here is an example of execution:

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```
Enter a number, or 0 (Zero) to quit.  
2 ↵  
Enter a number, or 0 (Zero) to quit.  
5 ↵  
Enter a number, or 0 (Zero) to quit.  
-1 ↵  
Enter a number, or 0 (Zero) to quit.  
0 ↵  
The product of the numbers you entered is -10.
```

Problem 4

Write a program that asks the user to guess your favorite number, and ask as long as the user did not guessed it or entered a value that was not an integer. You should keep the count of the “valid” attempts, i.e., of the number of times the user entered an integer that was not your favorite number.

Here is an example of execution, assuming my favorite number is 11:

```
Try to guess my favorite number!  
14 ↵  
Try to guess my favorite number!  
It's hard! ↵  
Try to guess my favorite number!  
10 ↵  
Try to guess my favorite number!  
11 ↵  
You won, it was 11! It took you 3 attempts.
```

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Problem 5

Answer the following short questions about the object-oriented paradigm.

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a) What is the return type of a constructor?

b) In the following, underline the signature of the method:

```
public int Scale(int ratio){length *= ratio;}
```

c) Define method overloading.

d) Write a “no args” constructor (that is, a constructor that takes 0 arguments) for a Square class that has one `int` attribute, called `dimension`.

e) What is the name of the method automatically called by C# when we are trying to display an object using `Console.WriteLine`?

f) Draw the UML diagram of a Square class with one attribute, an `int` called `dimension`, and two methods, a setter and a getter for `dimension`.