

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. You can use the abbreviations C.WL() and C.RL() as we do in class, but please make sure lower case and upper case letters are easy to distinguish. Every example of execution is displayed with the user input underlined, and carriage return is represented by ↵. This exam has 4 problems, for a total of 100 points.

**Problem 1.** Write a program that asks the user to guess your favorite number, and keep asking until the user guess it. 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. \_\_\_\_\_/30 p.

Here is an example of execution, assuming my favorite number is 11 (and is “hard-coded” )):

```
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.
```

**Problem 2.** Read the following code, and answer the following two questions:

```
switch (major) {
    case ("CS"):
    case ("AIST"):
    case ("CYBR"):
        if (graduation > 2020)
            if (passed) Console.WriteLine("You should take 1302.");
            else Console.WriteLine("You should take 1200.");
        break;
    case ("HIST"):
        if (graduation > 2020 && passed) Console.WriteLine("You should take 2600.");
        else if (passed) Console.WriteLine("You should take 2700.");
        break;
    case ("PHYS"):
    case ("CHEM"):
        if (passed) Console.WriteLine("You should take 1302.");
        else if (graduation > 2020) Console.WriteLine("You should take 1200.");
        break;
    default:
        if (passed) Console.WriteLine("You should take 1302.");
        else Console.WriteLine("You should take 1200.");
        break;
}
```

1. Depending on the values of passed, major and graduation, determine what would be displayed:

| passed (bool) | major (string) | graduation (int) | "You should take..." |
|---------------|----------------|------------------|----------------------|
| false         | "CS"           | 2021             |                      |
| true          | "PHYS"         | 2021             |                      |
| true          | "SOCI"         | 2019             |                      |
| false         | "CHEM"         | 2021             |                      |
| true          | "HIST"         | 2019             |                      |
| true          | "CYBR"         | 2021             |                      |
| false         | "COMM"         | 2021             |                      |

2. Give *two* sets of ("legal") values for which nothing would be displayed.

| passed | major | graduation |
|--------|-------|------------|
|        |       |            |
|        |       |            |

**Problem 3.** Write a program that asks the user for the current time (in 12-hours format, e.g. 1:30 PM, 9:50 AM, 12:01 AM, etc.) and convert it to 24-hours format (a.k.a. military time, e.g., 1330, 0950, 0001, etc.). \_\_\_\_\_/ 25 p.

You will need to get three pieces of information from the user : 1. if it is the morning or the afternoon (i.e., “AM” or “PM”), 2. the hour, and 3. the minutes.

To display e.g. the integer 950 as “0950”, you will need to use the `ToString` method of the `int` class with the argument `"D4"`. That is, `950.ToString("D4")` is the string `0950`, and `1330.ToString("D4")` is the string `1330` (i.e., it is not changed if it is already 4 digits long, and “padded” with 0s otherwise). Of course, you can use it with variables as well: if `myVar` is an `int` variable, then you can use `myVar.ToString("D4")`.

Two examples of execution, where the user input is underlined, and hitting “enter” is represented by `↵`, are:

Is it the morning? Enter "Y" for "Yes",  
anything else for no.

N ↵

Enter the hour followed by enter.

1 ↵

Enter the minutes followed by enter.

30 ↵

It is 1330.

Is it the morning? Enter "Y" for "Yes",  
anything else for no.

Y ↵

Enter the hour followed by enter.

9 ↵

Enter the minutes followed by enter.

50 ↵

It is 0950.

**You do not have to perform user-input validation, just assume that the user will always give you “good” data.**

\_\_\_\_\_/

25 p.

1. display "Hi" one hundred times at the screen.
2. generate a random integer between 1 and 10.
3. calls a static method `FromKelvinToCelsius` in the `ChemElem` with parameter 320.
4. display "Valid" at the screen if an `int` variable `age` is between 0 and 120.