

Validating Inputs

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This lab serves multiple goals:

- To reinforce your understanding of `TryParse` statements,
- To help you understand the value returned by `TryParse`,
- To help you understand the difference between `int.TryParse` and `double.TryParse`,
- To familiarize you with the tools to validate user input,
- To have you validate different kinds of inputs from the user, and
- (Optional) To manipulate user-input validation with classes.

1 Discovering TryParse's Behaviour

In your IDE, copy and paste the following:

```
Console.WriteLine("Enter... something!");  
int answer;  
bool valid = int.TryParse(Console.ReadLine(), out answer);  
Console.WriteLine($"returns: {valid}\nvalue:{answer}");
```

For each input in the table below:

1. in the returns column write whether the `TryParse` operation succeeded (`true` or `false`).
2. in the value column write the obtained numeric value after the `TryParse` operation.

The first few lines are given as examples; your task is to complete the rest of the table. You will need to update the program by replacing all the occurrences of `int` with `double` to test if your answers were correct in the second half of the table.

int.TryParse			double.TryParse	
Input	returns	value	returns	value
"160519"	true	160519	true	160519
"9432.0"	false	0	true	9432.0
"nope"	false	0	false	0
"12,804"				

int.TryParse	double.TryParse
"+5102"	
"2+2"	
" -322 "	
"(72);"	
"000"	
"78 095"	

Question: After completing the table, can you detect a pattern between “returns” and “value”?

2 Validating Inputs

For the following problems, perform this series of steps:

1. ask the user for input,
2. check that the input is valid according to the specific problem, and
3. perform the subsequent action.

If the provided input is not valid, request new input from the user until the user provides valid input. The beginning of the first and second problems are given to get you started.

1. Write a loop that displays: **Enter yes to quit:** and then checks the user’s input. Consider any of these variations to mean yes: “yes”, “YES”, “y”, “Y”. Once the user enters yes, exit the loop.

Solution (sketch)

```
Console.WriteLine("Enter yes to quit.");
string answer;
answer = Console.ReadLine();
while (answer != "yes"){
    Console.WriteLine("Enter yes to quit.");
    answer = Console.ReadLine();
}
Console.WriteLine("You exit the program.");
// Note that this program is not a complete solution: "YES", "y" or "Y"
// does not make the program quit.
```

2. Ask the user to enter a positive integer between (and including) 2 and 100. Validate the input, compute the sum of integers starting from 1 up to the integer the user entered, and display that sum. Here are examples:

- if the user enters 5, compute: $1 + 2 + 3 + 4 + 5$, then display 15 on the screen
- if the user enters 8, compute: $1 + 2 + 3 + 4 + 5 + 6 + 7 + 8$, then display 36 on the screen

Solution (sketch)

```
Console.WriteLine("Enter a number between 2 and 100.");
int answer;
answer = int.Parse(Console.ReadLine());
while (answer < 2){
    Console.WriteLine("That number is too small!");
    Console.WriteLine("Enter a number between 2 and 100.");
    answer = int.Parse(Console.ReadLine());
}
Console.WriteLine("You exit the program.");
```

```
// Note that this program is not a complete solution.
// Values greater than 100 are not rejected,
// And the final calculation is not done.
```

3. Do the following problem using the `decimal` type. Ask the user to enter any numbers which can be positive, negative, or zero. Ignore all non-numeric inputs using `TryParse`. Choose an appropriate sentinel value to enable the user to indicate when they are done. Compute and display the average of all the numbers that the user entered. If the user didn't enter any numbers, display "You did not enter any numbers".

Here is an example of the desired execution, where the user input is underlined, and hitting "enter" is represented by `↵`:

```
Please enter a number, or "Done" to exit:
8↵
Please enter a number, or "Done" to exit:
2↵
Please enter a number, or "Done" to exit:
Hold_on↵
Please enter a number, or "Done" to exit:
-5↵
Please enter a number, or "Done" to exit:
Done
```

The average of the numbers you entered is 1.66666666667.

3 Pushing Further (Optional)

This part is focused on input validation with classes. It requires reading a lengthy (but not very complicated) class implementation and then, improving it. It is *difficult* and is designed to offer an interesting challenge. However, you should be able to complete such exercises by the end of the semester without too many difficulties.

Start by downloading the `LoanCalculator`¹ solution which mixes classes and decision structures. Spend some time studying the implementation to understand *what* the program is doing and *how* it is doing it.

Next edit the `Program.cs` file of the `LoanCalculator` solution to add the following validation features:

1. Users that enter a value other than A, a, H, h, O, or o for the loan type will be asked again; they will be asked until they give a valid answer.
2. Users that enter a credit score that is not between 300 and 850, or one that is not an integer, will be asked again; they will be asked until they give a valid answer.
3. Users that enter an amount needed or a down payment that is not a decimal, or is a negative decimal, will be asked again; they will be asked until they give a valid answer.
4. (Optional) Use the `ToLower()`² or `ToUpper()`³ methods of the `char` class to make the program more readable – you will be able to greatly simplify the `if` statement that checks the loan type.
5. (Optional, hard) Write a method for the `Loan` class that takes a character as an argument, and returns the string describing the type of loan designated by that character. Then, use this method in the `ToString` method and in the application program instead of doing it manually.

¹labs/ValidatingInput/LoanCalculator.zip

²<https://docs.microsoft.com/en-us/dotnet/api/system.char.tolower?view=netframework-4.7.2>

³<https://docs.microsoft.com/en-us/dotnet/api/system.char.toupper?view=netframework-4.7.2>

Solution (sketch)

You can find a possible solution in this archive⁴.

⁴labs/ValidatingInput/Solution_LoanCalculator.zip