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Day 2 Exercises

25 Marks

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| **Submission Details:** | Please upload this document with your answers to the appropriate drop box. |
| **Late Penalty:** | **10% deducted each day this assignment is late so you can still submit late and get a decent mark within a reasonable time frame**. |

Object Oriented Development with .Net

Exercise 1 (5 marks)

I would like you to develop a console application to store and display a user's three favorite colours. Your application is defined by the following criteria:

1. Create a new C# Console Application.
2. Define a string array named favoriteColours with a length of 3 to store the user's favorite colours.
3. Console Input:
   1. Prompt the user with the question: "What is your favourite colour?". Store their answer in the first position of the favoriteColours array.
   2. Next, prompt the user with: "What is your 2nd favourite colour?". Store their answer in the second position of the favoriteColours array.
   3. Finally, ask: "What is your 3rd favourite colour?" and store their answer in the third position of the favoriteColours array.
4. Program Output:

After collecting all three colours, display the result in the following sentence format:

"Your top three colours are: [1st colour], [2nd colour] and [3rd colour]."

Ensure you replace [1st colour], [2nd colour], and [3rd colour] with the user's actual colour choices.

Paste your Main method in the box below.

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| public static void Main()  {  string[] favouriteColours = new string[3];  Console.WriteLine("What is your favourite colour?");  favouriteColours[0] = Console.ReadLine();  Console.WriteLine("What is your 2nd favourite colour?");  favouriteColours[1] = Console.ReadLine();  Console.WriteLine("What is your 3rd favourite colour?");  favouriteColours[2] = Console.ReadLine();  Console.WriteLine($"Your top three colours are: {favouriteColours[0]}, " +  $"{favouriteColours[1]} and {favouriteColours[2]}.");  Console.ReadLine();    } |

Paste a screenshot of your output in the box below.

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Exercise 2 (5 marks)

I would like you to develop a console application that accepts two integers from a user and displays the results of various arithmetic operations: addition, subtraction, multiplication, and division.

Console Input

Prompt the user to enter two integers sequentially. After each prompt, move the entered value from the console into a unique string variable.

Conversion

Convert each string input into an integer value using the Convert.ToInt32() method. This method will throw an exception if the user enters a non-numeric value, so you must handle the error.

Arithmetic Operations

* Perform and display the result of the addition of the two numbers.
* Perform and display the result of the subtraction of the second number from the first number.
* Perform and display the result of the multiplication of the two numbers.

**Note:** For the division operation, ensure the result retains the decimal places by casting the integers to double before the division. Display each result with a relevant message.

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| |  |  |  |  |  | | --- | --- | --- | --- | --- | | Error Handling  Implement error handling to catch any exceptions that may arise due to non-numeric inputs or other unexpected scenarios. Display a relevant error message to the user in such cases.  Output  Your happy path output should resemble this: | | |  | | --- | | A black and white screen with white text  Description automatically generated | | | | Your error handling should look like this: | |  | | --- | |  | | | |

Hints

To convert a string input to an integer:

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| int number1 = Convert.ToInt32(Console.ReadLine()); |

To avoid losing the decimal place in the division step, use the following:

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| double divisionResult = (double)number1 / (double)number2; |

Paste your Main method in the box below.

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| public static void Main()  {  int firstInteger;  int secondInteger;  string ERROR = "An unexpected error occurred. Please try again";  Console.Write("Enter the first integer: ");  string firstInput = Console.ReadLine();  if (Int32.TryParse(firstInput, out firstInteger))  {  Console.Write("Enter the second integer: ");  string secondInput = Console.ReadLine();  if (Int32.TryParse(secondInput, out secondInteger))  {  int resultAddition = firstInteger + secondInteger;  int resultSubtraction = firstInteger - secondInteger;  int resultMultiplication = firstInteger \* secondInteger;  double resultDivision = (double)firstInteger / (double)secondInteger;  Console.WriteLine();  Console.WriteLine($"The result of {firstInteger} + {secondInteger} is {resultAddition}");  Console.WriteLine($"The result of {firstInteger} - {secondInteger} is {resultSubtraction}");  Console.WriteLine($"The result of {firstInteger} \* {secondInteger} is {resultMultiplication}");  Console.WriteLine($"The result of {firstInteger} / {secondInteger} is {resultDivision}");  }  else  {  Console.WriteLine(ERROR);  }  }  else  {  Console.WriteLine(ERROR);  }  Console.ReadLine();  } |

Paste your happy path output in the box below.

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Paste your error path output in the box below.

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Exercise 3 (5 marks)

I would like you to develop a console application that determines a person's age category based on their provided age using an if else if statement. The categories are **Child**, **Teenager**, **Adult**, and **Senior**.

Console Input

Prompt the user to enter their friend’s age and read the entered value from the console.

Data Conversion

The input will be received as a string. Utilize int.TryParse() to safely attempt converting this string into an integer. The result of this method indicates if the conversion was successful.

Input Validation

Should the conversion fail, or the entered age is a negative number, display the message:

"Error: Please enter a valid positive age.". The program should then gracefully terminate.

Age Category Determination

Use the if else if structure combined with comparison operators to classify the entered age into one of the following groups:

* 0-12: "Child"
* 13-19: "Teenager"
* 20-64: "Adult"
* 65 and above: "Senior"

Program Output

Display the relevant age category based on the entered age.

Hint

While using int.TryParse(), it's beneficial to assess both the boolean result (indicating if the conversion succeeded) and the converted integer (to check if it's positive).

Paste your Main method in the box below.

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| public static void Main()  {  string ageGroup = "undetermined";  Console.Write("Please enter your age: ");  string ageInput = Console.ReadLine();  bool ageVerified = Int32.TryParse(ageInput, out int age);  if (!ageVerified || (age <= 0))  {  Console.WriteLine("Error: Please enter a valid positive age.");  }  else  {  if (age <= 12)  {  ageGroup = "Child";  }  else if (age > 12 && age <= 19)  {  ageGroup = "Teenager";  }  else if (age > 19 && age < 65)  {  ageGroup = "Adult";  }  else if (age >= 65)  {  ageGroup = "Senior";  }  Console.WriteLine($"Age classification: {ageGroup}");  }  Console.ReadLine();  } |

Paste a screenshot of your happy path output in the box below.

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Paste a screenshot of your error path output in the box below.

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Exercise 4 (5 marks)

I would like you to develop a console application that processes basic commands entered by the user using a switch statement. The application should handle commands such as **start**, **stop**, **restart**, and **exit**.

Console Input

Prompt the user to enter a command from the following options: **start**, **stop**, **restart**, or **exit**.

Command Processing

Use a switch statement to determine the user's command and display a corresponding action message:

* "start": "Starting the system..."
* "stop": "Stopping the system..."
* "restart": "Restarting the system..."
* "exit": "Exiting the system..."

The program should then gracefully terminate.

Default Case

If the user enters a command not on the list, the program should display this:

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The program should then gracefully terminate.

Paste your Main method in the box below.

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| public static void Main()  {  Console.Write("Please enter a command (start, stop, restart, exit): ");  string cmd = Console.ReadLine();  switch (cmd)  {  case ("start"):  {  Console.WriteLine("Starting the system...");  break;  }  case "stop":  {  Console.WriteLine("Stopping the system...");  break;  }  case "restart":  {  Console.WriteLine("Restarting the system...");  break;  }  case "exit":  {  Console.WriteLine("Exiting the system...");  break;  }  default:  {  Console.WriteLine("Invalid command.");  break;  }  }  Console.ReadLine();  } |

Paste a screenshot of one happy path output in the box below.

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Paste a screenshot of your error path output in the box below.

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Exercise 5 (5 marks)

I would like you to develop a console application that interprets the comfort level based on a given temperature in Celsius. This exercise reinforces concepts of data conversion, method utilization, and conditional logic.

Console Input

* Prompt the user to provide a temperature in Celsius.
* Store the input in a variable that can handle decimals.
* If the input isn’t numeric, display a message such as:

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| Invalid input. Please enter a numeric temperature. |

Temperature Conversion

Create a method named GetComfortMessage() that will:

* Accept the Celsius value as a parameter.
* Convert the Celsius temperature to Fahrenheit using this formula:

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| Fahrenheit = (Celsius \* 9/5) + 32 |

* Based on the Fahrenheit value, return one of the following messages:
  + Less than 32°F: "I am cold."
  + 32°F up to (but not including) 65°F: "It's chilly out."
  + 65°F up to (but not including) 80°F: "This feels good."
  + 80°F and above: "It is hot out."

Program Output

Call the new method from Main() and display the returned message in the console.

💡 Pro Tip: Use an if**…**else if**…**else structure to make the comfort-level decision.

Paste both methods in the box below.

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| static string GetComfortMessage(string initialTemp)  {  const string ERROR = "Invalid input. Please enter a numeric temperature in Celcius";  bool isValidTemp = float.TryParse(initialTemp, out float tempC);  if (isValidTemp)  {  float tempF = (tempC \* 9 / 5) + 32;  if (tempF < 32)  {  return "I am cold.";  }  else if (tempF >= 32 && tempF < 65)  {  return "It's chilly out.";  }  else if (tempF >= 65 && tempF < 80)  {  return "This feels good.";  }  else if (tempF >= 80)  {  return "It is hot out.";  }  }  return ERROR;  }  public static void Main()  {  Console.Write("Please enter a numeric temperature in Celcius: ");  string entryString = Console.ReadLine();  Console.Write(GetComfortMessage(entryString));  Console.ReadLine();  } |

Paste a screenshot of one happy path output in the box below.

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Paste a screenshot of your error path output in the box below.

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