LAB 10–1 ASSIGNMENT

Ch. 7 Input Validation

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Name: Imani Hollie

LAB 10–1.1 – ALGORITHMS

Algorithm 1: Design an algorithm that prompts the user to enter a positive nonzero number and validates the input.

```
//Declare Int variable
Declare Integer num
//Get user input
Display "Enter a positive nonzero number."
Input num
//Start input validation loop if num is negative or zero
While num <= 0
   Display "ERROR: This is not a valid entry."
   Display "Enter a positive nonzero number."
   Input num
End While
```

Algorithm 2: Design an algorithm that prompts the user to enter a number in the range of 1 – 100 and validates the input.

```
Declare Integer num
Display "Enter a number between 1 – 100."
Input num
//This is the exact same as A1 excluding the condition for the input
//validation loop, being it will reiterate if num if outside of range
While num < 1 OR num > 100
   Display "ERROR: This is not a valid entry."
   Display "Enter a number between 1 and 100."
   Input num
End While
```

Algorithm 3: Design an algorithm that prompts the user to enter "yes" or "no" and validates the input (Use case-insensitive comparison).

```
//Declare Str variable
Declare String answer
Display "Do you agree? (Enter Y for YES or N for NO)."
Input answer
//Start input validation loop if answer is neither y or n utilizing the
//toUpper library function to make it case sensitive for user input
While toUpper(answer) != "Y" OR toUpper(answer) != "N"
   Display "ERROR: This is not a valid entry."
   Display "Enter Y for YES or N for NO."
   Input answer
End While
```

Algorithm 4: Design an algorithm that prompts the user to enter a number that is greater than (>) 99 and validates the input.

```
Declare Integer num
Display "Enter a number greater than 99."
Input num
//This is the exact same as A1 excluding the condition for the input
//validation loop, being it will reiterate if num is less than (<) 99
While num < 99
   Display "ERROR: This is not a valid entry."
   Display "Enter a number greater than 99."
   Input num
End While
```

Algorithm 5: Design an algorithm that prompts the user to enter a secret word. The secret word should be at least 8 characters long. Validate the input.

```
Declare String word
Display "Enter secret word (Must be at least 8 characters)."
Input word
//This is the exact same as A3 excluding the condition for the input
//validation loop, being it will reiterate if word is less than 8
//characters in length
While length(word) < 8
   Display "The secret word must be at least 8 characters."
   Display "Enter new secret word."
   Input word
End For
```

LAB 10–1.2 – DEBUGGING EXERCISES

Exercise 1: Why does the following pseudocode not perform as indicated in the comments?

```
1. //This program asks the user to enter a value between 1 and 10 and validate
2. //the input
3. Declare Integer value
4. //Get a value from the user
5. Input value
6. //Make sure the value is between 1 and 10
7. While value < 1 AND value > 10
    8. Display "ERROR: The value must be between 1 and 10."
    9. Display "Enter a value between 1 and 10."
    10. Input value
11. End While
```

An error occurs in Line 7, because the AND comparison operator indicates that both conditions have to be true for the argument to pass, which isn't possible as value can't be less than 1 and greater than 10, making it an infinite loop. To correct this, use an OR comparison operator so then either of the conditions have to be true, as follows:

```
1. //This program asks the user to enter a value between 1 and 10 and validate
2. //the input
3. Declare Integer value
4. //Get a value from the user
5. Input value
6. //Make sure the value is between 1 and 10
7. While value < 1 OR value > 10
    8. Display "ERROR: The value must be between 1 and 10."
    9. Display "Enter a value between 1 and 10."
    10. Input value
11. End While
```

STARTING OUT WITH PROGRAMMING LOGIC AND DESIGN CH. 7

Exercise 2: Why does the following pseudocode not perform as indicated in the comments?

```
1. //This program gets a dollar amount from the user and validates the input
2. Declare Real amount
3. //Get the amount from the user
4. Display "Enter a dollar amount."
5. Input amount
6. //Make sure the amount is not less than zero. If it is, get a new amount
7. //from the user
8. While amount < 0
   9. Display "ERROR: The dollar amount cannot be less than 0."
   10. Display "Enter a dollar amount."
11. End While
```

An error occurs between Lines 10 and 11, because there isn't a way to get new user input should the amount entered be less than 0, making it an infinite loop. To correct this, insert another line and get the user input, as follows:

```
1. //This program gets a dollar amount from the user and validates the input
2. Declare Real amount
3. //Get the amount from the user
4. Display "Enter a dollar amount."
5. Input amount
6. //Make sure the amount is not less than zero. If it is, get a new amount
7. //from the user
8. While amount < 0
   9. Display "ERROR: The dollar amount cannot be less than 0."
   10. Display "Enter a dollar amount."
   11. Input amount
11. End While
```

Exercise 3: The following pseudocode works, but it performs in a case-sensitive validation of the user's input. How could the algorithm be improved so the user does not have to pay attention to capitalization when entering a name?

```
1. //This program asks the user to enter a string and validates the input
2. Declare String choice
3. //Get the user's response
4. Display "Cast your vote for Chess Team Captain."
5. Display "Would you like to nominate Lisa or Tim?"
6. Input choice
7. //Validate the input
8. While choice != "Lisa" AND choice != "Tim"
   9. Display "Please enter Lisa or Tim."
   10. Display "Cast your vote for the Chess Team Captain."
   11. Display "Would you like to nominate Lisa or Tim?"
   12. Input response
13. End While
```

An improvement can be made on Lines 8 and an error occurs on Line 12: On Line 8, the user input can be made case-sensitive by inserting the toUpper function on the choice variable, that way the user can input any case so long as the characters match; On Line 12, an error occurs because the response variable is used but is never declare, to correct this, replace it with the choice variable, as follows:

```
1. //This program asks the user to enter a string and validates the input
2. Declare String choice
3. //Get the user's response
4. Display "Cast your vote for Chess Team Captain."
5. Display "Would you like to nominate Lisa or Tim?"
6. Input choice
7. //Validate the input
8. While toUpper(choice) != "Lisa" AND toUpper(choice) != "Tim"
   9. Display "Please enter Lisa or Tim."
   10. Display "Cast your vote for the Chess Team Captain."
   11. Display "Would you like to nominate Lisa or Tim?"
   12. Input choice
13. End While
```