Test Plan

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CMSC115

Chapter 6, Project 5

November 26, 2024

**Program Goals & Objectives**

The primary objective of this program is to format an integer by adding leading zeros based on a user-specified width. The program prompts the user to enter an integer and a desired width, then displays the formatted number accordingly. If the specified width is less than or equal to the length of the integer, the original number is displayed without additional zeros. Otherwise, the program prepends zeros to the integer to match the specified width. This program is designed to practice string manipulation, conditional logic, loops, and user input handling in Java.

**Program Functional Requirements**

1. User Input
   1. The program should prompt the user to enter a number (integer).
   2. The program should prompt the user to enter a width (integer).
2. Data Processing
   1. Convert the integer to its string representation.
   2. Determine the length of the integer string.
   3. Compare the specified width with the length of the integer string.
      1. If the width is less than or equal to the length of the integer string then…
         1. Use the integer string as is.
      2. If the width is greater than the length of the integer string then…
         1. Calculate the number of leading zeros needed (width minus the length of the integer string).
3. Output
   1. Display the formatted number with the appropriate number of leading zeros.

**Program Pseudocode**

START

Ask user to enter an integer

Get the integer from user

Ask user to enter the width

Get the width from user

Convert the number to a string

IF the width is less than or equal to the number's length THEN

Return the original number string

ELSE

Create an empty string builder

Add leading zeros (width minus length of number times)

Append the original number

Convert the result to final string

END IF

Display the formatted number

END

**Program Flowchart**

**A diagram of a diagram

Description automatically generated**

**Table 1 – Traceability Matrix**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test Case | Input/Output | Expected Result | Actual Result | Outcome  (Pass/Fail) |
| 1a | Enter an integer: 1  Enter the width: 5 | The formatted number is 00001 | The formatted number is 00001 | Pass |
| 2a | Enter an integer: a | Invalid input handling | Exception in thread "main" java.util.InputMismatchException | Fail |
| 3a | Enter an integer: 10  Enter the width: 2 | The formatted number is 10 | The formatted number is 10 | Pass |