Assignment 2 Testing Report

This document presents a comprehensive testing report for Assignment 2 that:
- Reads integers from a user-specified input file.
- Computes the sum, average, squares of each number, and the sum of those squares.
- Writes the results into an output file named 'output.txt'.

Standard Input

Description: A file with a standard list of positive integers.

Input File Content: 1 2 3 4 5 6

Expected Output:
The numbers are: 1 2 3 4 5 6
Sum: 21
Average: 3
Squares: 1 4 9 16 25 36
The sum of squares: 91

Notes: This is the typical use case as described in the program comments.

Empty Input File

Description: The input file is empty.

Input File Content: (empty)

Expected Output:
Error: The input file is empty. The program terminates with return code 1

Notes: This tests the program's ability to handle an empty input file correctly.

Input With Single Number

Description: The input file contains only one integer.

Input File Content: 10

Expected Output:
The numbers are: 10
Sum: 10
Average: 10
Squares: 100
The sum of squares: 100

Notes: Confirms that the program handles a single number correctly.

Input With Negative Numbers

Description:
The input file contains negative integers.

Input File Content:
-1 -2 -3 -4

Expected Output:
The numbers are: -1 -2 -3 -4
Sum: -10
Average: -2
Squares: 1 4 9 16
The sum of squares: 30

Notes: This case tests the program's arithmetic when dealing with negative values.

Input with Mixed Positive and Negative Numbers

Description: The input file contains both positive and negative integers.

Input File Content: 5 -3 7 -2

Expected Output:
The numbers are: 5 -3 7 -2
Sum: 7
Average: 1
Squares: 25 9 49 4
The sum of squares: 87

Notes: This verifies that the program can correctly compute results when numbers of different signs are provided.

Input With Extra Whitespace and Newlines

Description: The input file contains extra spaces and newline characters.

Input File Content:
```
   3    4
5
   6
```

Expected Output:
The numbers are: 3 4 5 6
Sum: 18
Average: 4
Squares: 9 16 25 36
The sum of squares: 86

Notes: This case ensures that the program correctly parses integers regardless of whitespaces.

Input with Non-Numeric Values (Edge Case)

Description: The input file contains non-numeric values along with valid ones

Input File Content: 1 two 3

Expected Output:
The numbers are: 1
Sum: 1
Average: 1
Squares: 1
The sum of squares: 1

Notes: This test case highlights that the program does not explicitly handle non-numeric input. Only valid integers are processed.

File Not Found (Edge Case)

Description: The user specifies a file name that does not exist.

Input File Content: not_exist_file.txt

Expected Output:
Error: Input file could not be opened. The program terminates with status 1

Notes: This ensures that the program checks for the existence of the input file before processing.