CSE-016 Programming Lab Assignment № 2

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Document structure is detailed in the second page.
Solutions begin from the third page.

1 Problems

1.1 Problem (1)

John is responsible for planting the street with trees; he can give you the length of the street in meters, the distance between each two trees in a meter, and the cost of planting each tree in dollars. Write a program that should read this information and then print the number of trees needed and the total cost.

1.2 Problem (2)

Write a program that calculates the squares, cubes, square root, and exponent (e^x) of the numbers from 0 to 5 and uses tabs to print the following table of values:

Number	Square	Cube	Root	Exponent
0	0	0	0.0	1.0
..	..	..	..	..
..	..	..	..	..

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2 Solutions

2.1 Solution to Problem (1)

2.1.1 Source Code

Program's `main.c` File – console input/output-oriented application to solve the problem

```c
#include <math.h>
#include <stdio.h>

int main() {
  // Runtime variable declarations
  float streetlen, treedist, treecost, totalcost;
  int treenum;

  // Input prompts
  printf("Hello, John! Let's help you fill the street with trees.\n\n");
  printf("Please enter the length of the street (m): ");
  scanf("%f", &streetlen);
  printf("Now enter the distance you want between each tree (m): ");
  scanf("%f", &treedist);
  printf("Great! Finally, enter the cost of planting one tree ($): ");
  scanf("%f", &treecost);
  printf("\n"); // To separate input from results

  // Calculations
  treenum = 1 + floor(streetlen / treedist);
  totalcost = (float) treecost * treenum;

  // Outputting the results
  printf("You will have to plant %d tree(s)\n", treenum);
  printf("The total price you'll pay will be $%.2f\n", totalcost);

  return 0;
}
```

2.1.2 Outcome

Test Input Samples

#	Street Length	Distance Btn. Trees	Cost/ Tree
(1)	100	10	12
(2)	987	10	13.98

Obtained Results

#	Number of Trees	Total Cost
(1)	11	132.00
(2)	99	1384.02

The obtained results match the expected results.

Console Output

Program's output to console in plaintext – using inputs from test sample (1)

```
Hello, John! Let's help you fill the street with trees.

Please enter the length of the street (m): 100
Now enter the distance you want between each tree (m): 10
Great! Finally, enter the cost of planting one tree ($): 12

You will have to plant 11 tree(s)
The total price you'll pay will be $132.00
```

Turn over the page for the solution to problem (2)

2.2 Solution to Problem (2)

2.2.1 Source Code

Program's `main.c` File – console application to output the full table as described in the problem

```
1  #include <math.h>
2  #include <stdio.h>
3
4  int main() {
5    printf("Number\tSquare\tCube\tRoot\tExponent\n");
6    printf("0\t%d\t%d\t%.1f\t%.1f\n",((int)pow(0,2)),((int)pow(0,3)),sqrt(0),exp(0));
7    printf("1\t%d\t%d\t%.1f\t%.1f\n",((int)pow(1,2)),((int)pow(1,3)),sqrt(1),exp(1));
8    printf("2\t%d\t%d\t%.1f\t%.1f\n",((int)pow(2,2)),((int)pow(2,3)),sqrt(2),exp(2));
9    printf("3\t%d\t%d\t%.1f\t%.1f\n",((int)pow(3,2)),((int)pow(3,3)),sqrt(3),exp(3));
10   printf("4\t%d\t%d\t%.1f\t%.1f\n",((int)pow(4,2)),((int)pow(4,3)),sqrt(4),exp(4));
11   printf("5\t%d\t%d\t%.1f\t%.1f\n",((int)pow(5,2)),((int)pow(5,3)),sqrt(5),exp(5));
12   return 0;
13 }
```

Please note that the line numbers are purely for readability purposes and are not part of the code.
*Please also note that on lines where there is no new line number, there is **NO** actual line break in the code and that this is meant to be read as one single line.*

2.2.2 Outcome

Console Output

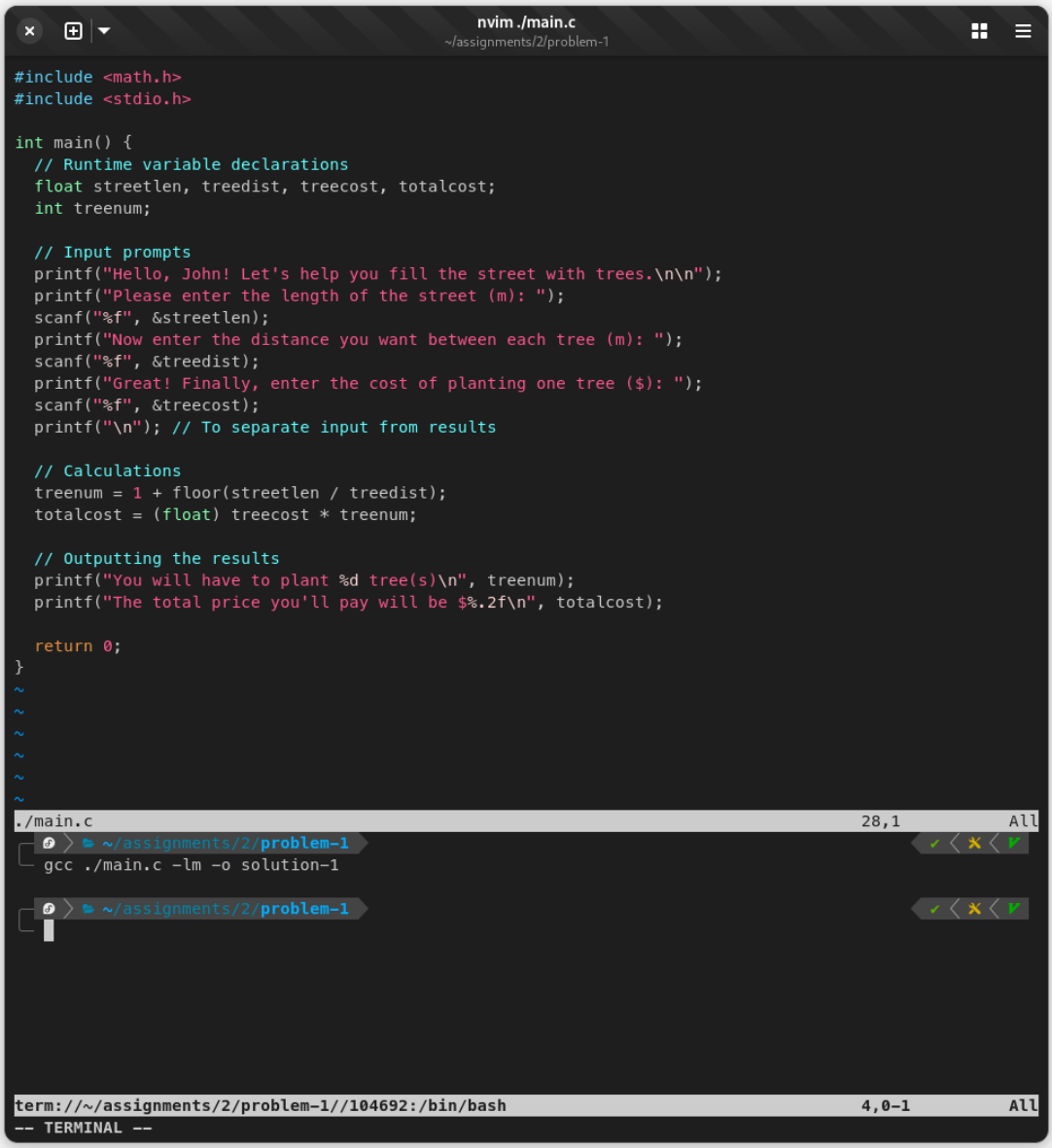
Program's output to console in plaintext

```
Number  Square  Cube    Root    Exponent
0       0       0       0.0     1.0
1       1       1       1.0     2.7
2       4       8       1.4     7.4
3       9       27      1.7     20.1
4       16      64      2.0     54.6
5       25      125     2.2     148.4
```

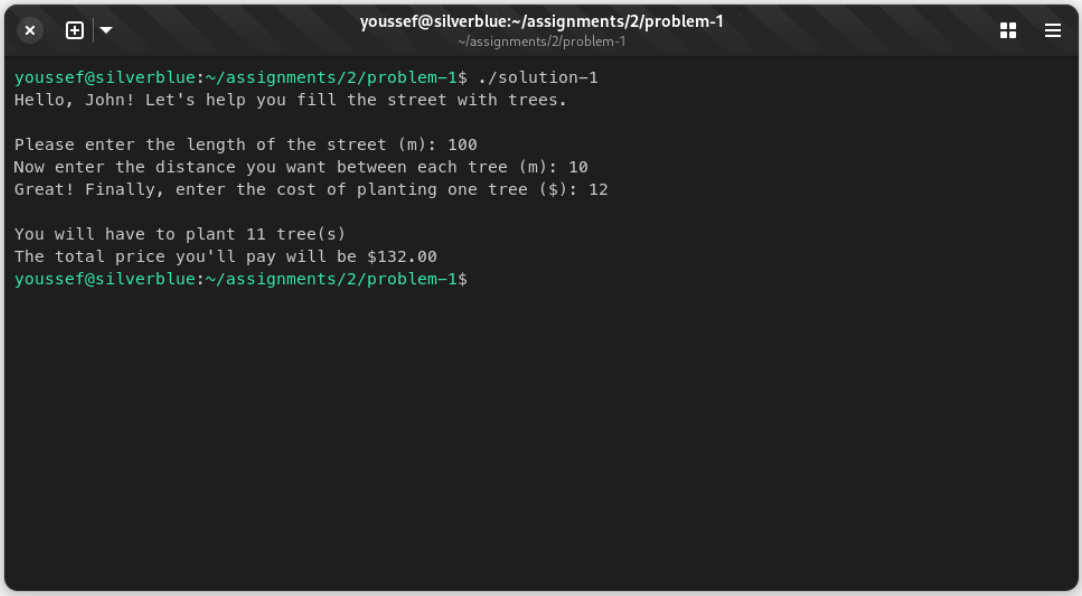
2.3 Evidence of Work (Screenshots)

2.3.1 Problem (1) Screenshots

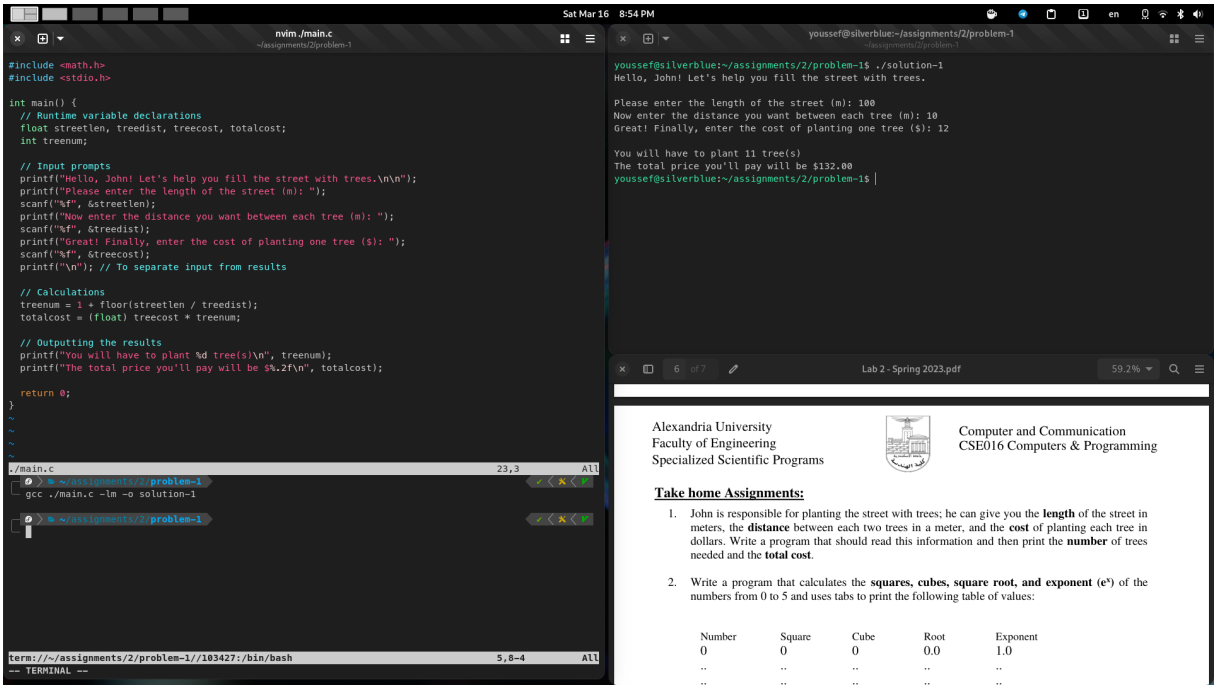
Close Up Source-code Screenshot



Close Up Output Console Screenshot

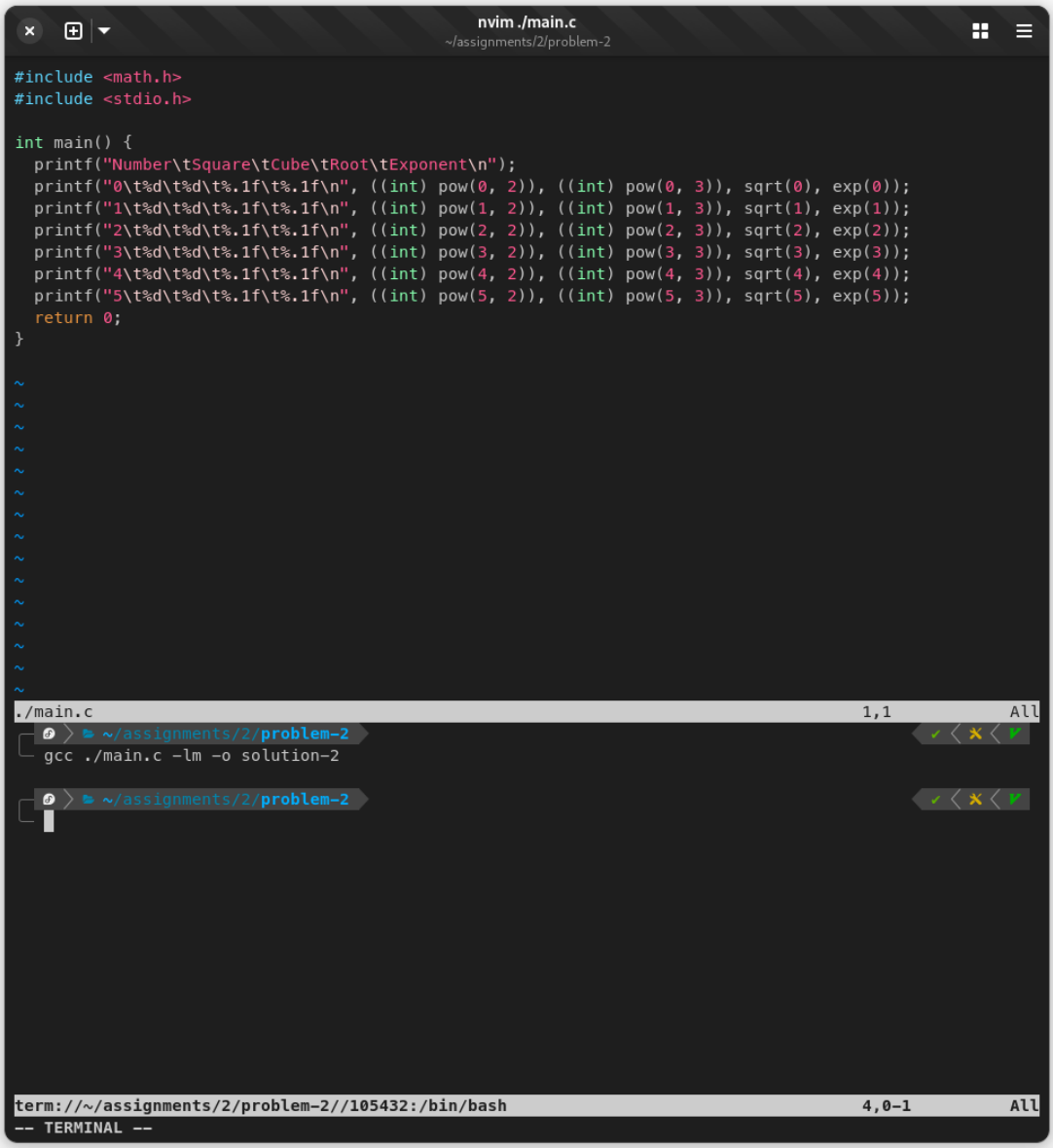


Linux Desktop Screenshot

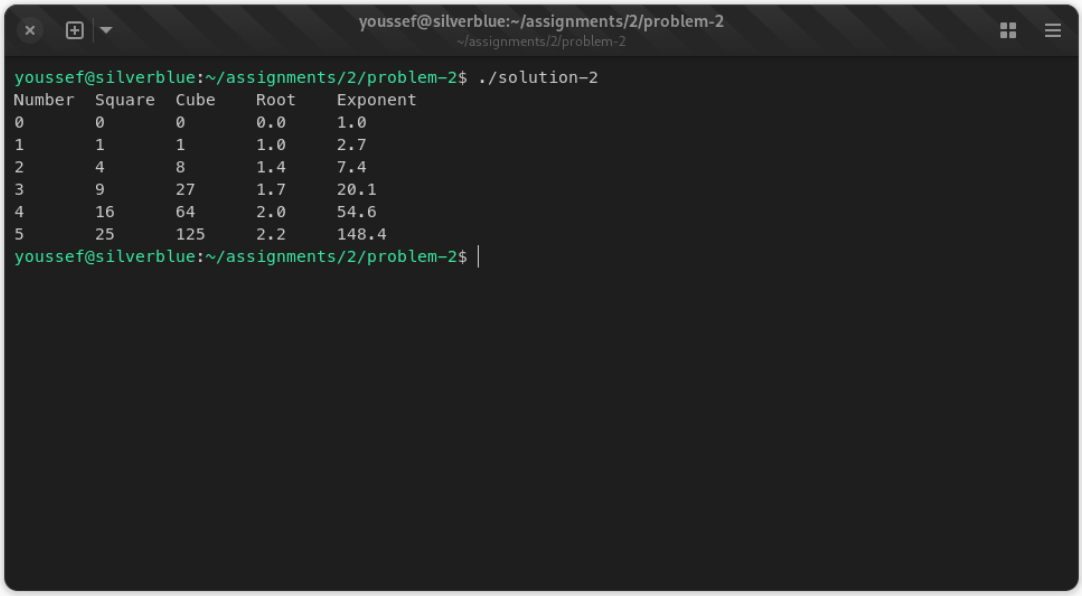


2.3.2 Problem (2) Screenshots

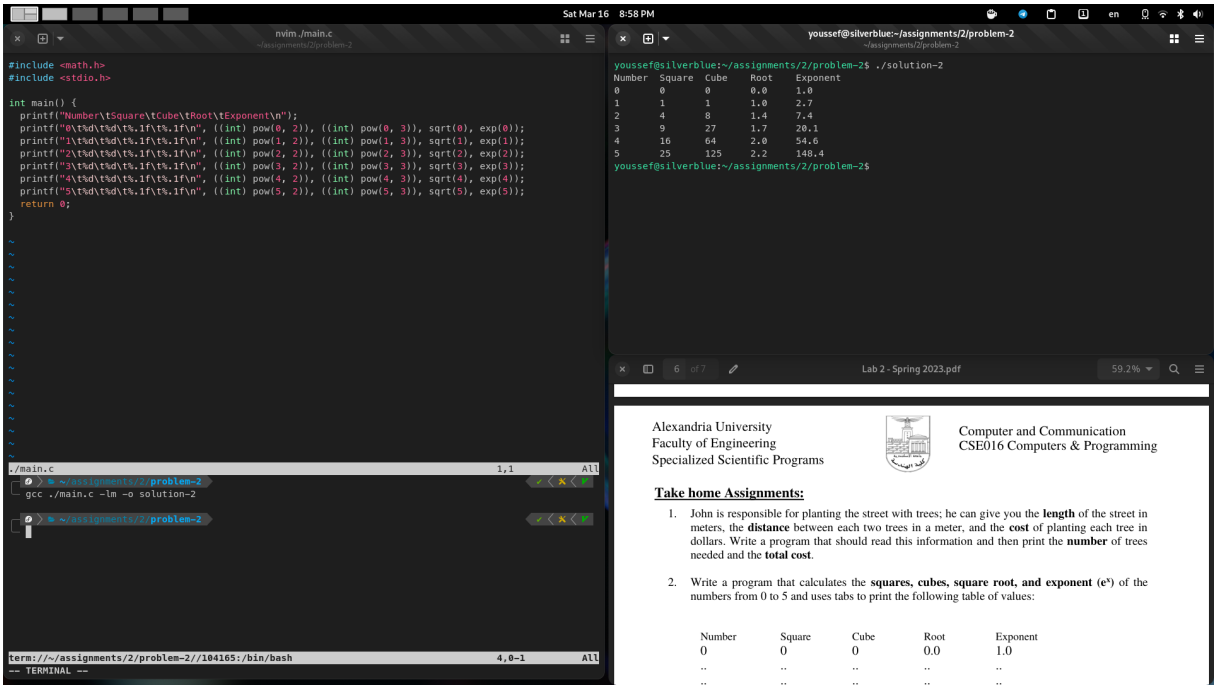
Close Up Source-code Screenshot



Close Up Output Console Screenshot



Linux Desktop Screenshot



2.4 Specifications

- **Libraries:**
  - `stdio.h`
  - `math.h`
- **Compiler:** GNU C Compiler (`gcc`) version 13.2.1 20231205 (Red Hat 13.2.1-6)
- **Supported Platforms:** OS: (any), architecture: (any)
- **Tested On:**
  - Compiled on Fedora 39 Workstation Linux
  - Ran on Fedora 39 Silverblue Workstation Linux

3 Licenses & Warranty

The source code will be released past the assignment's deadline under my public git repository at https://github.com/y-samy/9545-assignments/tree/main/CSE-016/Lab-2/assignment-2.
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