CSE-016 Programming Lab Assignment № 2

16/03/2024

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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

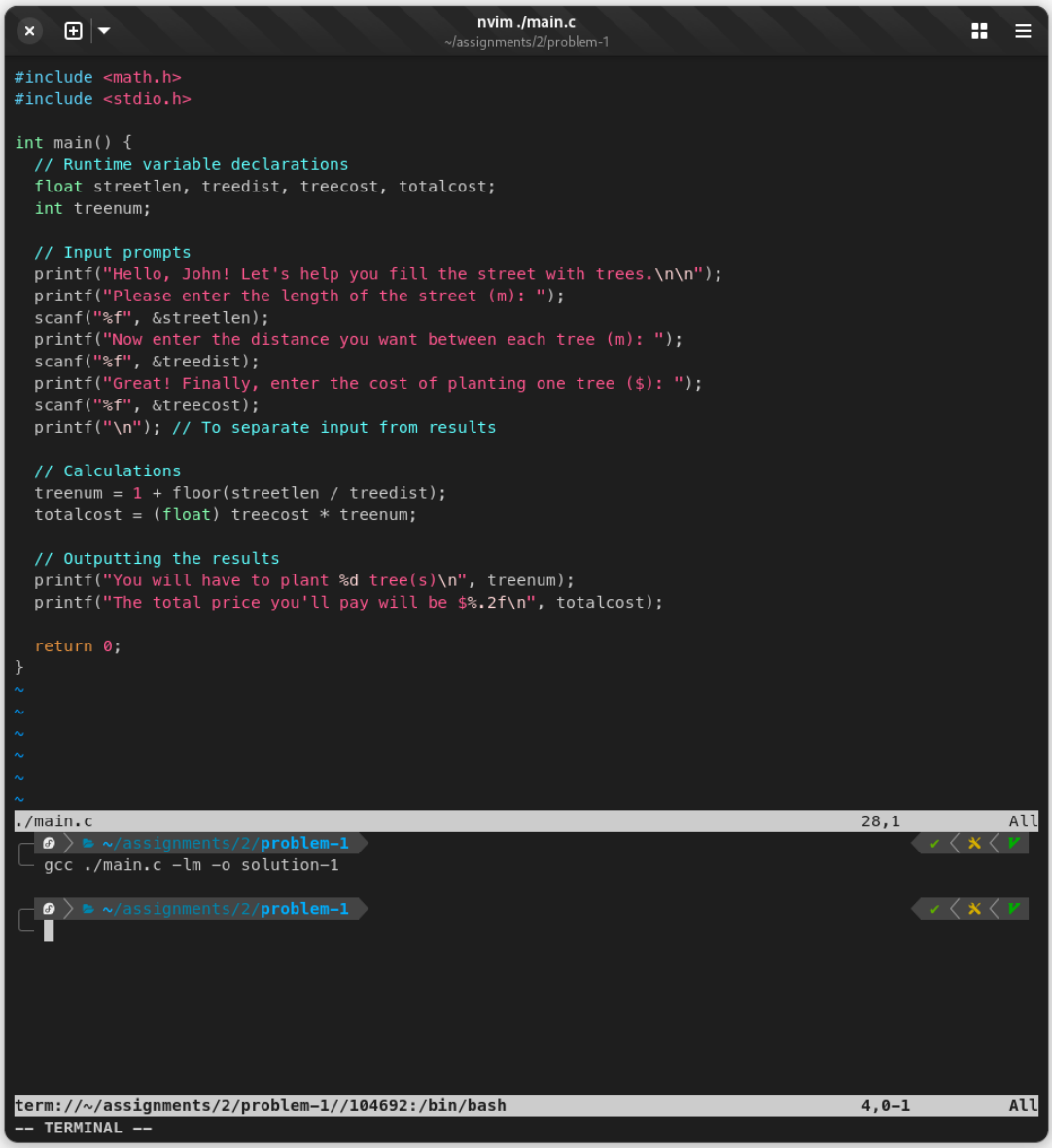
Program's output to console in plaintext

```
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
```

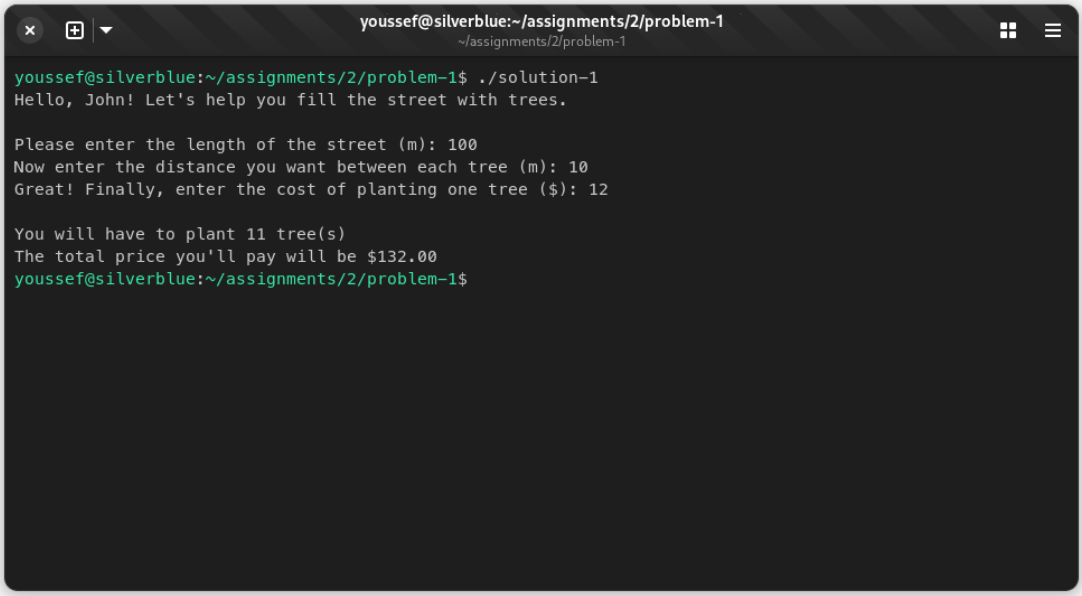
2.3 Evidence of Work (Screenshots)

2.3.1 Problem (1) Screenshots

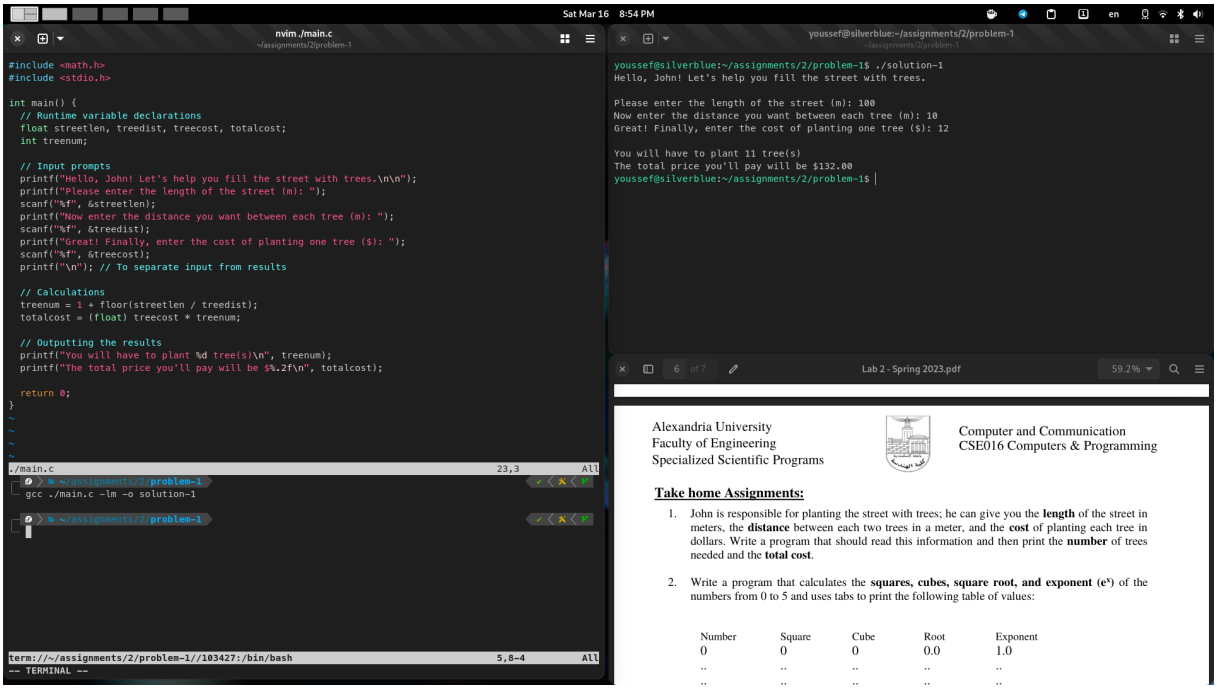
Close Up Source-code Screenshot



Close Up Output Console Screenshot

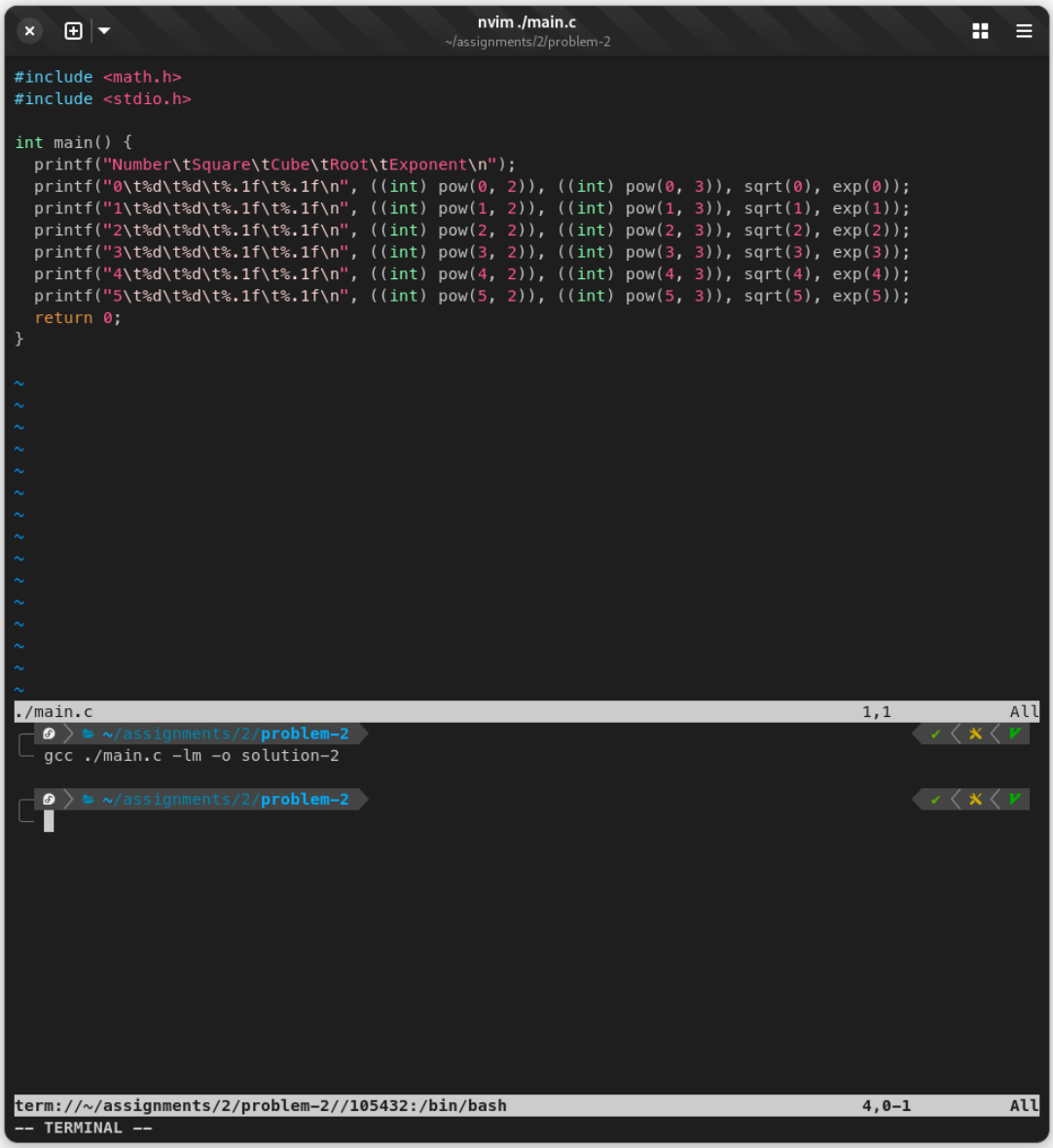


Linux Desktop Screenshot

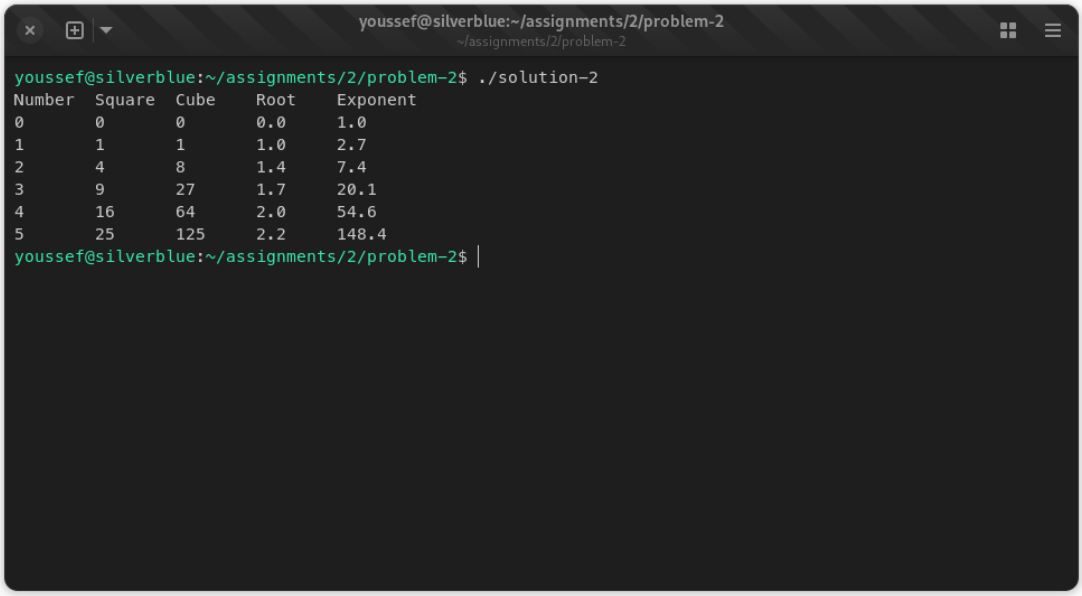


2.3.2 Problem (2) Screenshots

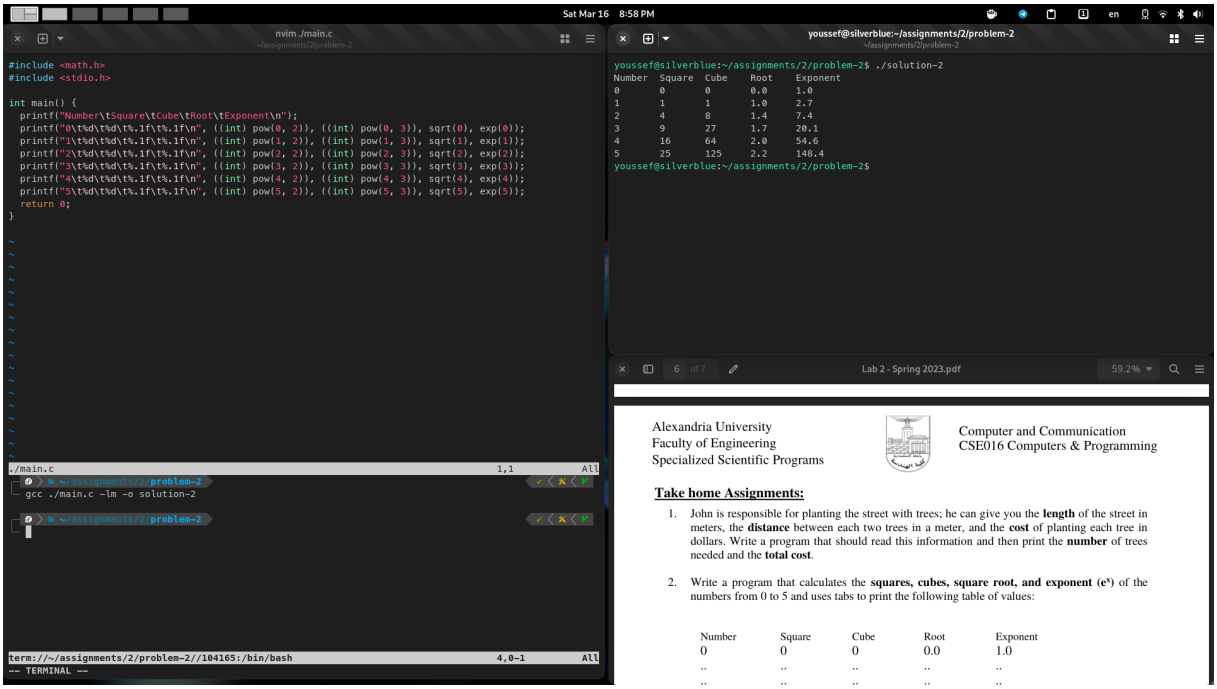
Close Up Source-code Screenshot



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

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