MINI PROJECT REPORT

1 Objective of the Project :

To create a program which calculates some useful mathematical operations.

2 Function[F] Description :

[F1] *SHOW* : Showing all operations.

[F2] *CHOOSE* : Choosing whichever want to run.

[F3] *ADDITION* : Adding all the entered numbers.

[F4] *SUBSTRACTION* : Subtraction of all the entered values.

[F5] *AVERAGE* : Average the entered values.

[F6] *DIVISION* : Division of the entered numbers.

[F7] *IS_PRIME* : Checking whether a number is a prime or not.

[F8] *PRINT_PATTERN* :Printing the pattern.

[F9] *FACTORIAL_OF_A_NUMBER* :To find the factorial of a number.

[F10] *IS_A_NUMBER_Perfect* :To find a entered number is a perfect or not.

[F11] *CREATE_A_MATRIX* : Create a matrix of given rows and column and print.

[F12] *EXPONENTIAL_of_A_NUMBER* : To calculate exponential of a given number and print.

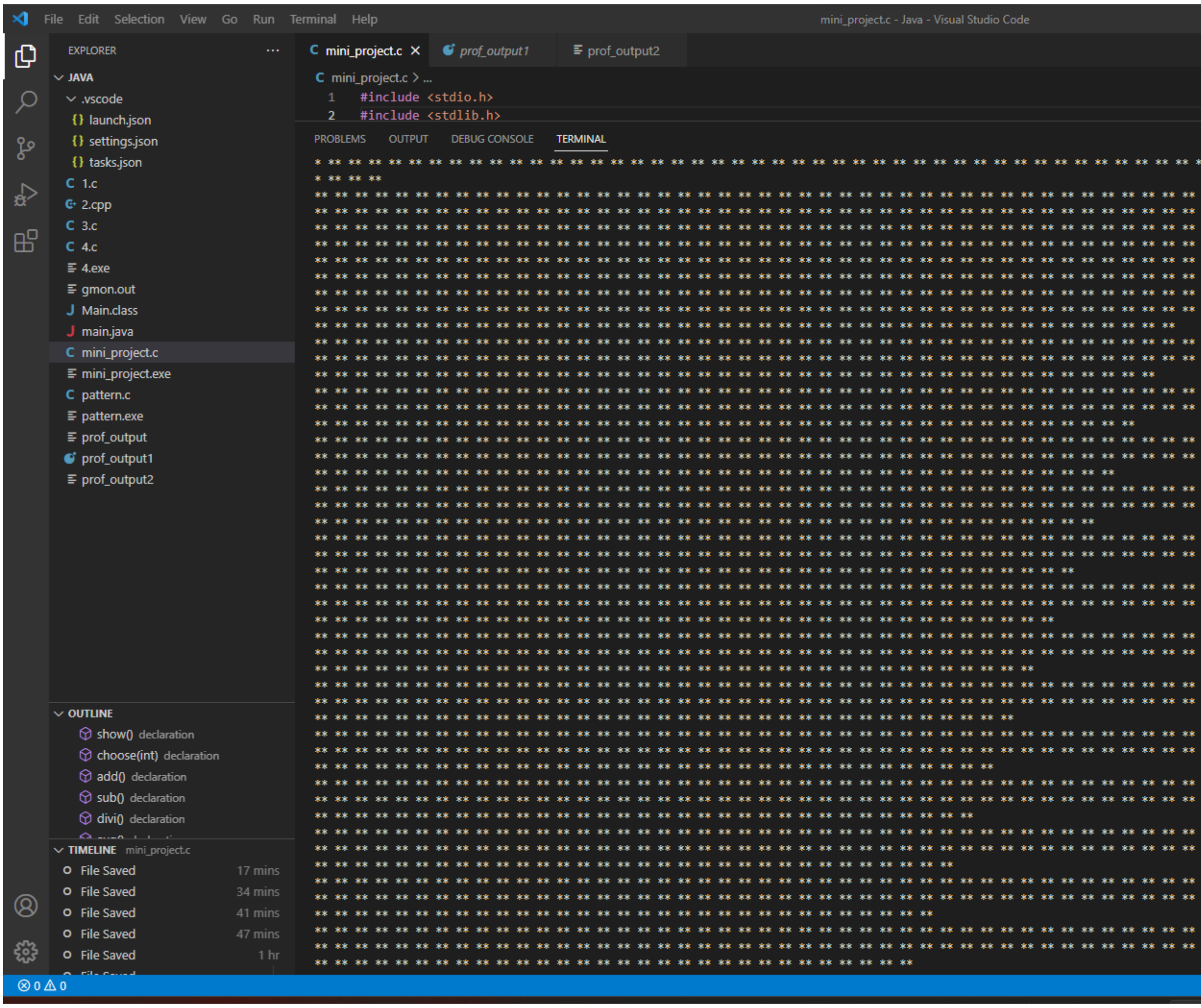
3 Program Code :

```
#include <stdio.h>
#include <stdlib.h>
#include <math.h>
#include <conio.h>

void show();
void choose(int x);
float add();
float sub();
float divi();
float avg();
void is_prime(int X);
int Is_a_perfect_no(int X);
float Exponential();
double fact(int X);
void Pattern();
void create_matrix();

int main()
{
    int k=1;
    printf("Playing with no.:\n\n");
    show();

   printf("\n\n");
   while(k<11){
    switch (k)
    {
    case 1:
        choose(k);
        printf("Addition: %f\n", add());
        break;

    case 2:
        choose(k);
        printf("Substraction: %f\n", sub());
        break;
```

```
case 3:
    choose(k);
    printf("Average:␣%f\n", avg());
    break;

case 4:
    choose(k);
    printf("Division␣is␣%f\n", divi());
    break;

case 5:
    choose(k);
    printf("Enter␣any␣digit:\n");
    int n;
    while (n != -1)
    {
    scanf("%d", &n);
    is_prime(n);
    }
    break;

case 6:
    choose(k);
    Pattern();
    break;

case 7:
    choose(k);
    printf("Enter␣any␣digit:\n");
    int l;
    scanf("%d", &l);
    Is_a_perfect_no(l);
    break;

case 8:
   choose(k);
   printf("We␣get:␣%f\n",Exponential())  ;
    break;

case 9:
        choose(k);
        create_matrix();
        break;
    case 10:
         choose(k);
         printf("Enter any digit:\n");
        int g;
        scanf("%d", &g);
         printf("Factorial of %d is %lf\n", g, fact(g));
         break;

    default:
         printf("\n\nEnd.\n");
    }
    k++;
    printf("\n\n");
    }
    return 0;
}
void show(){
    printf("1.Adiition:\n");
    printf("2.Substraction:\n");
    printf("3.Average:\n");
    printf("4.Division:\n");
    printf("5.Is prime or not until '-1':\n");
    printf("6.Print pattern:\n");
    printf("7.Is a perfect no. or not:\n");
    printf("8.Exponential of no.s:\n");
    printf("9.Create matrix:\n");
    printf("10.Factorial:\n");
    printf("\n\n");
    }
void choose(int x){
switch (x)
    {
    case 1:
        printf("1.Adiition:\n");
        break;

    case 2:
        printf(”2.Substraction:\n”);
        break;

    case 3:
        printf(”3.Average:\n”);
        break;

    case 4:
      printf(”4.Division:\n”);
        break;

    case 5:
        printf(”5.Is␣prime␣or␣not␣until␣'−1':\n”);
        break;

    case 6:
         printf(”6.Print␣pattern:\n”);
        break;

    case 7:
        printf(”7.Is␣a␣perfect␣no.␣or␣not:\n”);
          break;

    case 8:
       printf(”8.Exponential␣of␣no.s:\n”);
         break;

    case 9:
         printf(”9.Create␣matrix:\n”);
        break;

    case 10:
         printf(”10.Factorial:\n”);
         break;

    }
}
float add()
{
    float X, sum = 1;
    printf("␣-1␣to␣terminate:\n");
    while (X != -1)
    {
        scanf("%f", &X);
        sum = sum + X;
    }

    return sum;
}
float sub()
{
    float sum = 0, X, Y;
    printf("Enter␣any␣two␣digits:\n");
    scanf("%f\n␣%f", &X, &Y);
    sum = X - Y;

    return sum;
}
float avg()
{
    float X, count = 0, sum = 1, avg = 0;
    printf("␣-1␣to␣terminate:\n");
    while (X != -1)
    {
        count++;
        scanf("%f", &X);
        sum = sum + X;
    }
    avg = sum / (count - 1);
    return avg;
}
float divi()
{
    float X, Y;
    printf("Enter␣any␣two␣digits:\n");
    scanf("%f\n␣%f", &X, &Y);
    return X / Y;
}
void is_prime(int X)
{
    int flag = 0;
    for (int i = 2; i <= X - 1; i++)
    {
        if (X % i == 0)
        {
            flag = 1;
        }
    }
    if ( flag == 1 )
    {
        printf("%d is not a prime no.\n", X);
    }
    else if ( X == -1)
    {
        printf("Exit\n");


    }
    else {
        printf("%d is a prime no.\n", X);
        printf("Enter next:\n");
        }
}
void Pattern()
{
    int X, Y;
    printf("Enter no. of rows and column:\n");
    scanf("%d\n %d", &X, &Y);
    for (int i = 1; i < X; i++)
    {
        for (int j = i; j < Y; j++)
        {
            printf("** ");
        }
        printf("\n");
    }
}
double fact(int X)
{
    if(X==0 || X== 1){
        return 1;
    }
    else{
        return (X*fact(X-1));
    }
}
int Is_a_perfect_no(int X)
{

    int rem, sum = 0, i;

    for (i = 1; i < X; i++)
    {
        rem = X % i;
        if (rem == 0)
        {
            sum = sum + i;
        }
    }
    if (sum == X)
        printf("␣%d␣is␣a␣Perfect␣Number", X);
    else
        printf("\n␣%d␣is␣not␣a␣Perfect␣Number", X);

    return 0;
}
void create_matrix()
{   int X, Y;
    printf("Enter␣no.␣of␣column␣and␣rows:\n");
    scanf("%d\n␣%d", &X, &Y);
    printf("Enter␣the␣elemrnts:\n");
    int num, arr[X][Y];
    for (int i = 0; i < X; i++)
    {
        for (int j = 0; j < Y; j++)
        {
            scanf("%d", &num);
            arr[i][j] = num;
        }
    }
    printf("\n ");
    for (int i = 0; i < X; i++)
    {
        for (int j = 0; j < Y; j++)
        {
            printf("%d  ", arr[i][j]);
        }
        printf("\n ");
    }
}
float Exponential()
{   float X, Y;
    printf("Enter base and exponent:\n");
    scanf("%f\n %f", &X, &Y);
    float exp = pow(X, Y);
    return exp;
}
```

end

4 Output :



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

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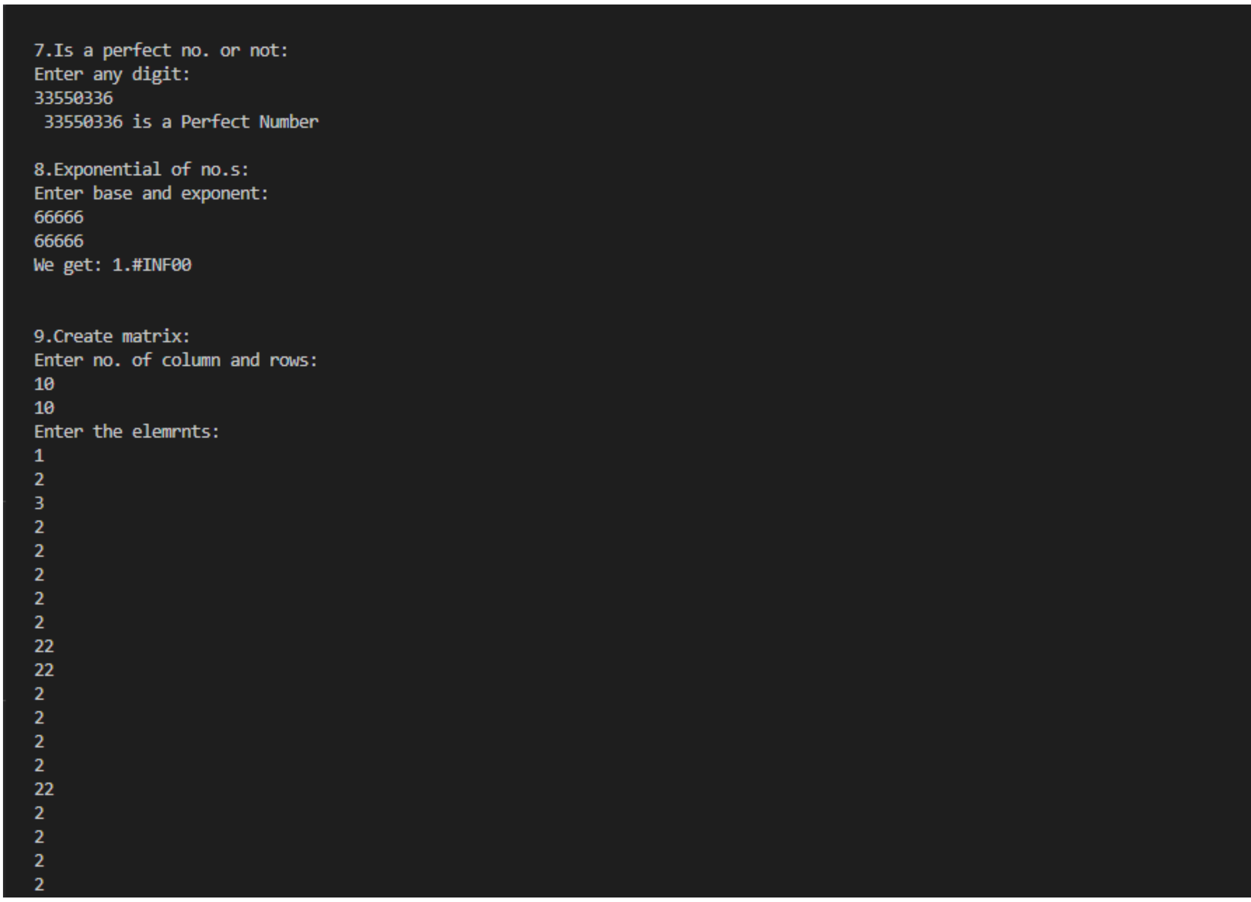
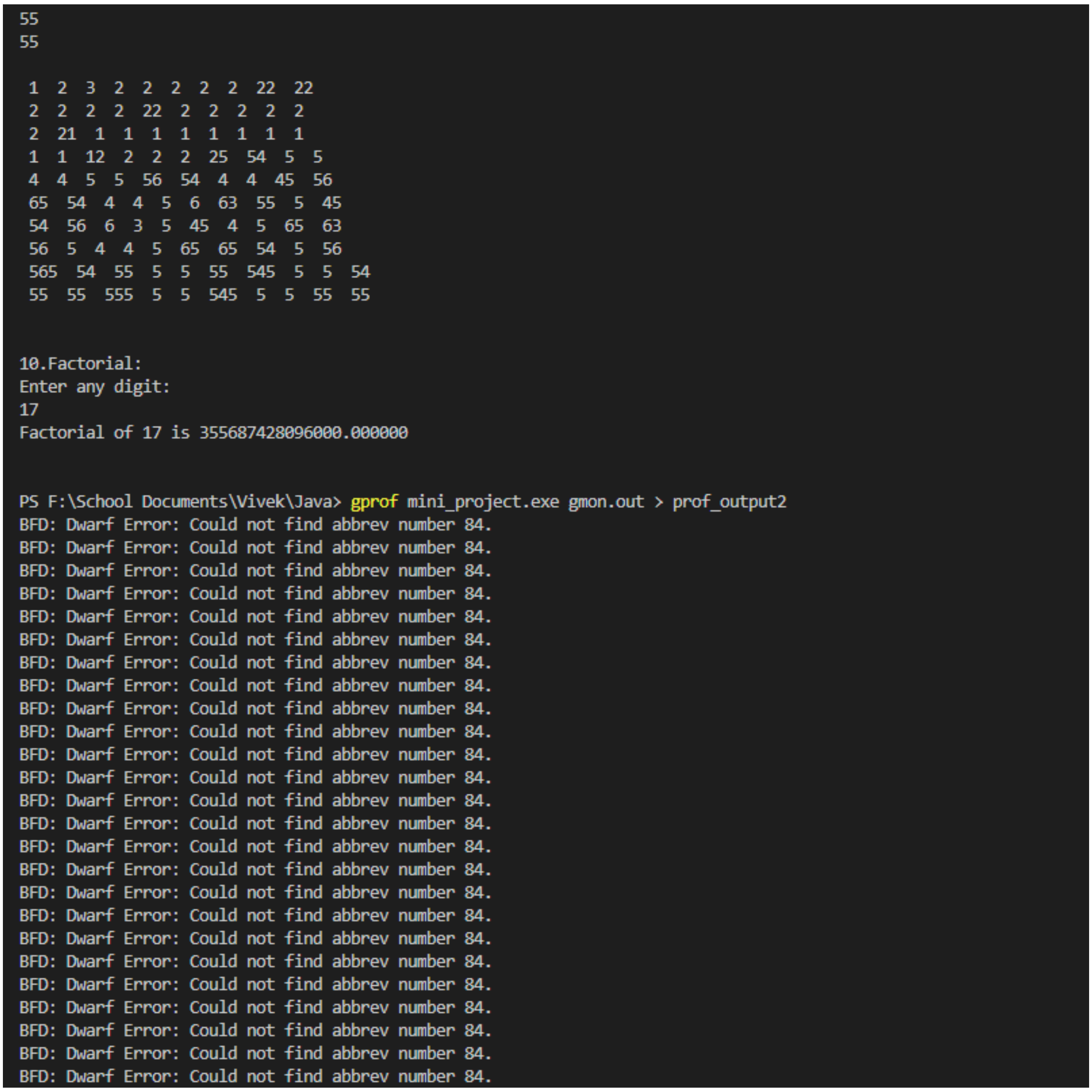


```
7.Is a perfect no. or not:
Enter any digit:
33550336
 33550336 is a Perfect Number

8.Exponential of no.s:
Enter base and exponent:
66666
66666
We get: 1.#INF00


9.Create matrix:
Enter no. of column and rows:
10
10
Enter the elemrnts:
1
2
3
2
2
2
2
2
22
22
2
2
2
2
22
2
2
2
2
```



```
55
55

 1  2  3  2  2  2  2  2  22  22
 2  2  2  2  22  2  2  2  2  2
 2  21  1  1  1  1  1  1  1  1
 1  1  12  2  2  2  25  54  5  5
 4  4  5  5  56  54  4  4  45  56
 65  54  4  4  5  6  63  55  5  45
 54  56  6  3  5  45  4  5  65  63
 56  5  4  4  5  65  65  54  5  56
 565  54  55  5  5  55  545  5  5  54
 55  55  555  5  5  545  5  5  55  55


10.Factorial:
Enter any digit:
17
Factorial of 17 is 355687428096000.000000


PS F:\School Documents\Vivek\Java> gprof mini_project.exe gmon.out > prof_output2
BFD: Dwarf Error: Could not find abbrev number 84.
BFD: Dwarf Error: Could not find abbrev number 84.
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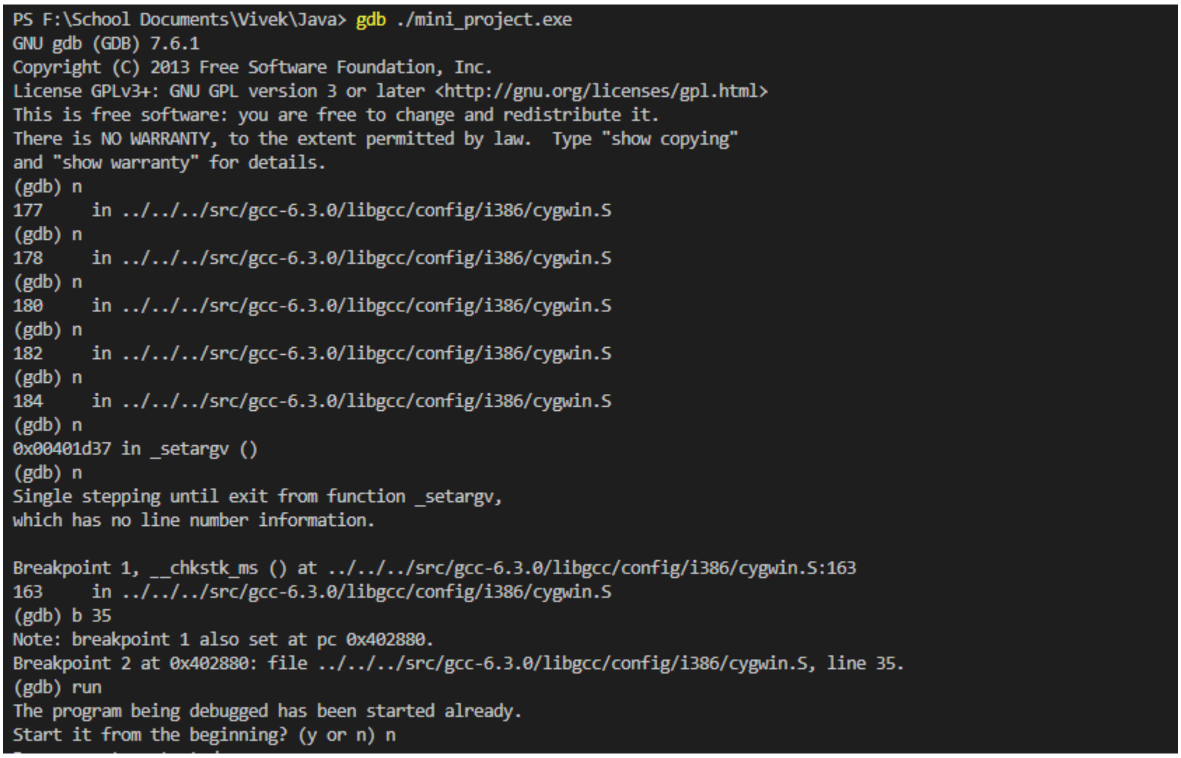
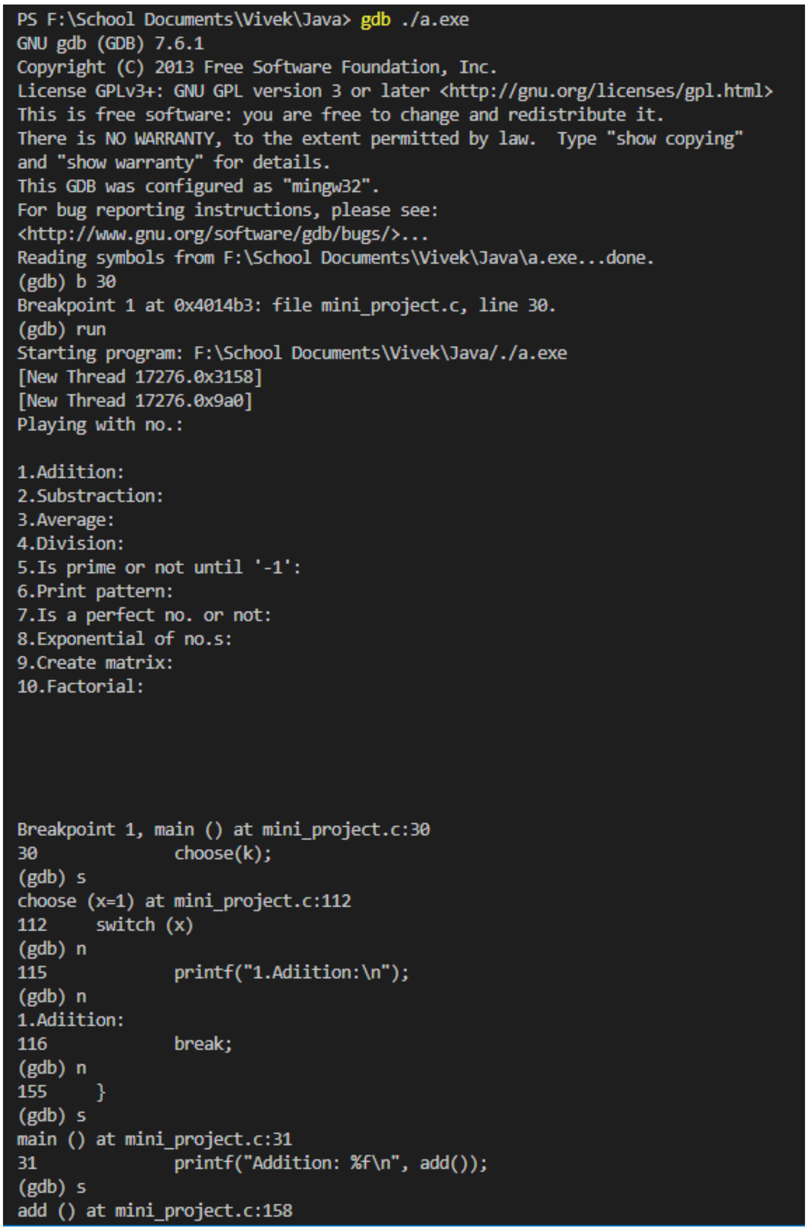
5 Debugging :



```
PS F:\School Documents\Vivek\Java> gdb ./mini_project.exe
GNU gdb (GDB) 7.6.1
Copyright (C) 2013 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.  Type "show copying"
and "show warranty" for details.
(gdb) n
177     in ../../../src/gcc-6.3.0/libgcc/config/i386/cygwin.S
(gdb) n
178     in ../../../src/gcc-6.3.0/libgcc/config/i386/cygwin.S
(gdb) n
180     in ../../../src/gcc-6.3.0/libgcc/config/i386/cygwin.S
(gdb) n
182     in ../../../src/gcc-6.3.0/libgcc/config/i386/cygwin.S
(gdb) n
184     in ../../../src/gcc-6.3.0/libgcc/config/i386/cygwin.S
(gdb) n
0x00401d37 in _setargv ()
(gdb) n
Single stepping until exit from function _setargv,
which has no line number information.

Breakpoint 1, __chkstk_ms () at ../../../src/gcc-6.3.0/libgcc/config/i386/cygwin.S:163
163     in ../../../src/gcc-6.3.0/libgcc/config/i386/cygwin.S
(gdb) b 35
Note: breakpoint 1 also set at pc 0x402880.
Breakpoint 2 at 0x402880: file ../../../src/gcc-6.3.0/libgcc/config/i386/cygwin.S, line 35.
(gdb) run
The program being debugged has been started already.
Start it from the beginning? (y or n) n
```

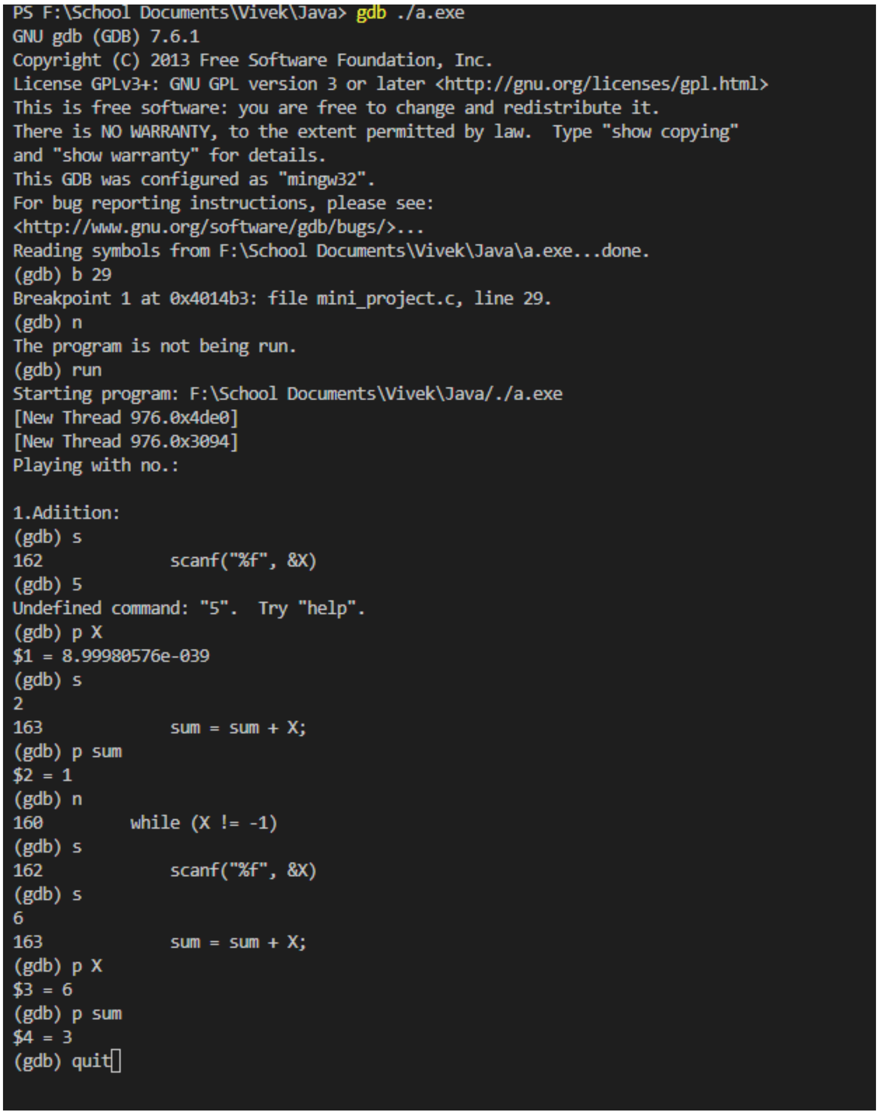


```
PS F:\School Documents\Vivek\Java> gdb ./a.exe
GNU gdb (GDB) 7.6.1
Copyright (C) 2013 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.  Type "show copying"
and "show warranty" for details.
This GDB was configured as "mingw32".
For bug reporting instructions, please see:
<http://www.gnu.org/software/gdb/bugs/>...
Reading symbols from F:\School Documents\Vivek\Java\a.exe...done.
(gdb) b 30
Breakpoint 1 at 0x4014b3: file mini_project.c, line 30.
(gdb) run
Starting program: F:\School Documents\Vivek\Java/./a.exe
[New Thread 17276.0x3158]
[New Thread 17276.0x9a0]
Playing with no.:

1.Adiition:
2.Substraction:
3.Average:
4.Division:
5.Is prime or not until '-1':
6.Print pattern:
7.Is a perfect no. or not:
8.Exponential of no.s:
9.Create matrix:
10.Factorial:

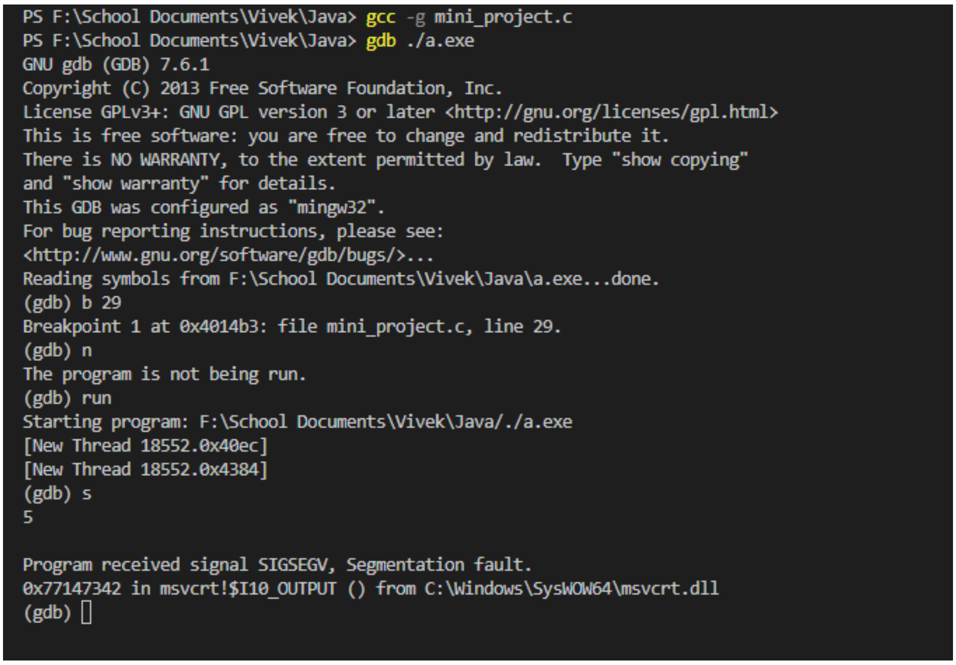



Breakpoint 1, main () at mini_project.c:30
30              choose(k);
(gdb) s
choose (x=1) at mini_project.c:112
112         switch (x)
(gdb) n
115             printf("1.Adiition:\n");
(gdb) n
1.Adiition:
116             break;
(gdb) n
155         }
(gdb) s
main () at mini_project.c:31
31              printf("Addition: %f\n", add());
(gdb) s
add () at mini_project.c:158
```



```
PS F:\School Documents\Vivek\Java> gdb ./a.exe
GNU gdb (GDB) 7.6.1
Copyright (C) 2013 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.  Type "show copying"
and "show warranty" for details.
This GDB was configured as "mingw32".
For bug reporting instructions, please see:
<http://www.gnu.org/software/gdb/bugs/>...
Reading symbols from F:\School Documents\Vivek\Java\a.exe...done.
(gdb) b 29
Breakpoint 1 at 0x4014b3: file mini_project.c, line 29.
(gdb) n
The program is not being run.
(gdb) run
Starting program: F:\School Documents\Vivek\Java/./a.exe
[New Thread 976.0x4de0]
[New Thread 976.0x3094]
Playing with no.:

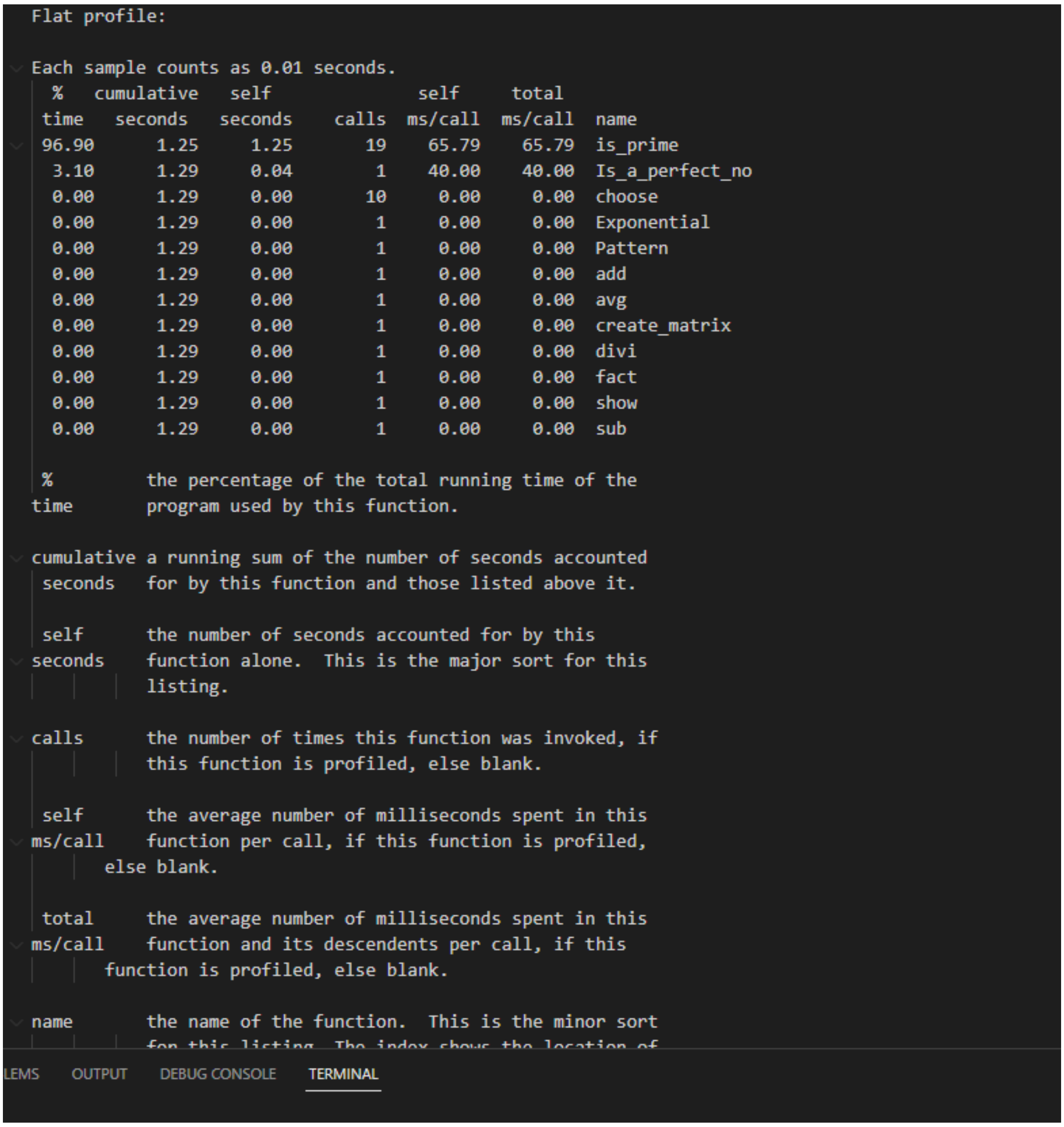
1.Adiition:
(gdb) s
162             scanf("%f", &X)
(gdb) 5
Undefined command: "5".  Try "help".
(gdb) p X
$1 = 8.99980576e-039
(gdb) s
2
163             sum = sum + X;
(gdb) p sum
$2 = 1
(gdb) n
160         while (X != -1)
(gdb) s
162             scanf("%f", &X)
(gdb) s
6
163             sum = sum + X;
(gdb) p X
$3 = 6
(gdb) p sum
$4 = 3
(gdb) quit
```



```
PS F:\School Documents\Vivek\Java> gcc -g mini_project.c
PS F:\School Documents\Vivek\Java> gdb ./a.exe
GNU gdb (GDB) 7.6.1
Copyright (C) 2013 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.  Type "show copying"
and "show warranty" for details.
This GDB was configured as "mingw32".
For bug reporting instructions, please see:
<http://www.gnu.org/software/gdb/bugs/>...
Reading symbols from F:\School Documents\Vivek\Java\a.exe...done.
(gdb) b 29
Breakpoint 1 at 0x4014b3: file mini_project.c, line 29.
(gdb) n
The program is not being run.
(gdb) run
Starting program: F:\School Documents\Vivek\Java/./a.exe
[New Thread 18552.0x40ec]
[New Thread 18552.0x4384]
(gdb) s
5

Program received signal SIGSEGV, Segmentation fault.
0x77147342 in msvcrt!$I10_OUTPUT () from C:\Windows\SysWOW64\msvcrt.dll
(gdb) 
```

6 Profiling :



```
Flat profile:

Each sample counts as 0.01 seconds.
  %   cumulative   self              self     total
 time   seconds   seconds    calls  ms/call  ms/call  name
 96.90      1.25     1.25       19    65.79    65.79  is_prime
  3.10      1.29     0.04        1    40.00    40.00  Is_a_perfect_no
  0.00      1.29     0.00       10     0.00     0.00  choose
  0.00      1.29     0.00        1     0.00     0.00  Exponential
  0.00      1.29     0.00        1     0.00     0.00  Pattern
  0.00      1.29     0.00        1     0.00     0.00  add
  0.00      1.29     0.00        1     0.00     0.00  avg
  0.00      1.29     0.00        1     0.00     0.00  create_matrix
  0.00      1.29     0.00        1     0.00     0.00  divi
  0.00      1.29     0.00        1     0.00     0.00  fact
  0.00      1.29     0.00        1     0.00     0.00  show
  0.00      1.29     0.00        1     0.00     0.00  sub

 %         the percentage of the total running time of the
time       program used by this function.

cumulative a running sum of the number of seconds accounted
 seconds   for by this function and those listed above it.

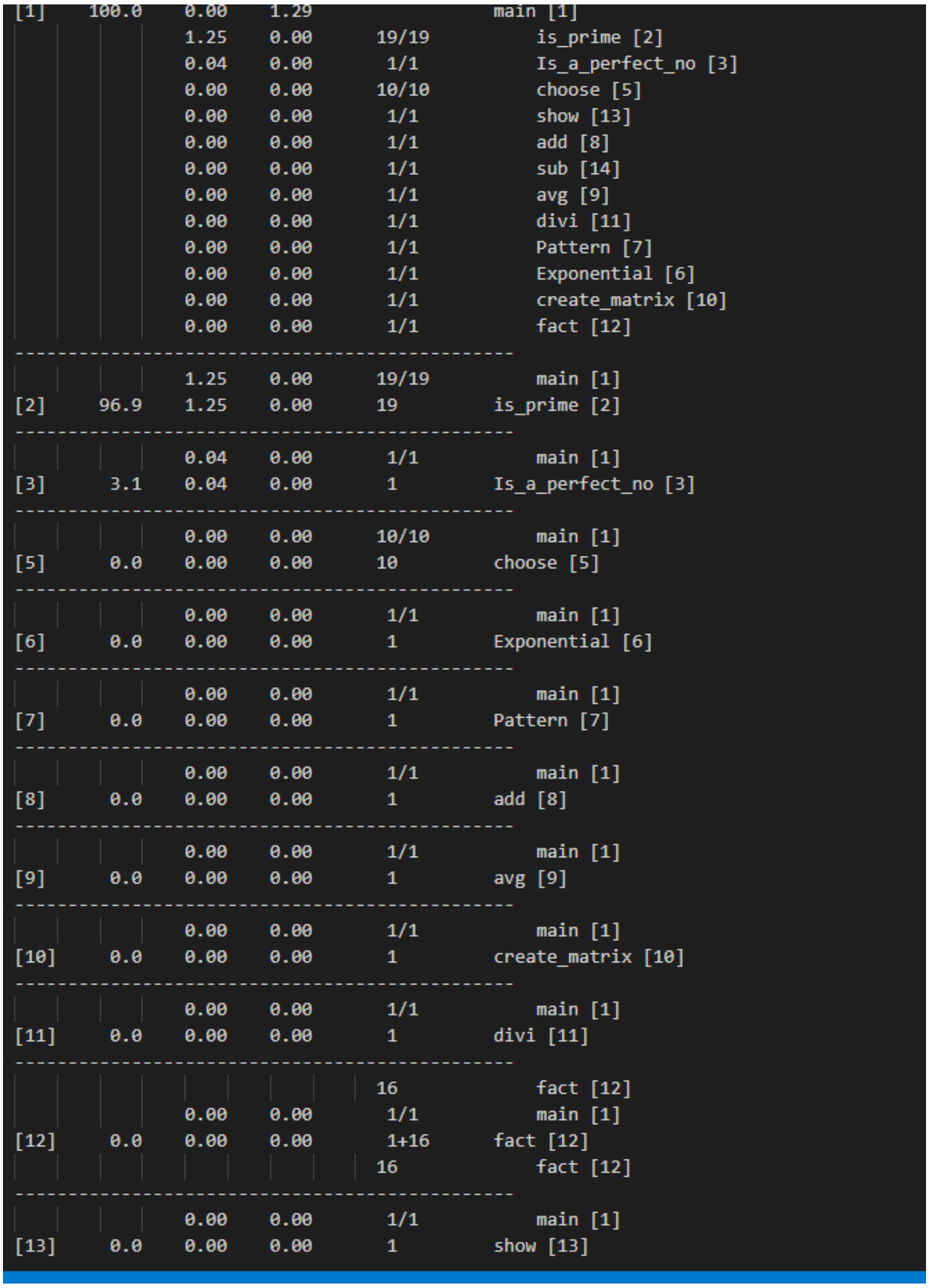
 self      the number of seconds accounted for by this
seconds    function alone.  This is the major sort for this
           listing.

calls      the number of times this function was invoked, if
           this function is profiled, else blank.

 self      the average number of milliseconds spent in this
ms/call    function per call, if this function is profiled,
       else blank.

 total     the average number of milliseconds spent in this
ms/call    function and its descendents per call, if this
       function is profiled, else blank.

name       the name of the function.  This is the minor sort
           for this listing. The index shows the location of
```



```
[1]    100.0    0.00    1.29                 main [1]
                1.25    0.00    19/19            is_prime [2]
                0.04    0.00     1/1             Is_a_perfect_no [3]
                0.00    0.00    10/10            choose [5]
                0.00    0.00     1/1             show [13]
                0.00    0.00     1/1             add [8]
                0.00    0.00     1/1             sub [14]
                0.00    0.00     1/1             avg [9]
                0.00    0.00     1/1             divi [11]
                0.00    0.00     1/1             Pattern [7]
                0.00    0.00     1/1             Exponential [6]
                0.00    0.00     1/1             create_matrix [10]
                0.00    0.00     1/1             fact [12]
-----------------------------------------------
                1.25    0.00    19/19            main [1]
[2]     96.9    1.25    0.00    19           is_prime [2]
-----------------------------------------------
                0.04    0.00     1/1             main [1]
[3]      3.1    0.04    0.00     1           Is_a_perfect_no [3]
-----------------------------------------------
                0.00    0.00    10/10            main [1]
[5]      0.0    0.00    0.00    10           choose [5]
-----------------------------------------------
                0.00    0.00     1/1             main [1]
[6]      0.0    0.00    0.00     1           Exponential [6]
-----------------------------------------------
                0.00    0.00     1/1             main [1]
[7]      0.0    0.00    0.00     1           Pattern [7]
-----------------------------------------------
                0.00    0.00     1/1             main [1]
[8]      0.0    0.00    0.00     1           add [8]
-----------------------------------------------
                0.00    0.00     1/1             main [1]
[9]      0.0    0.00    0.00     1           avg [9]
-----------------------------------------------
                0.00    0.00     1/1             main [1]
[10]     0.0    0.00    0.00     1           create_matrix [10]
-----------------------------------------------
                0.00    0.00     1/1             main [1]
[11]     0.0    0.00    0.00     1           divi [11]
-----------------------------------------------
                                16               fact [12]
                0.00    0.00     1/1             main [1]
[12]     0.0    0.00    0.00     1+16        fact [12]
                                16               fact [12]
-----------------------------------------------
                0.00    0.00     1/1             main [1]
[13]     0.0    0.00    0.00     1           show [13]
```

7 Information regarding Mini project :

Starting Date -13/11/22

Starting Day : -Sunday

Ending Date : -16/11/22

Ending Day : -Wednesday

Total Time required : - 3 days

Total line of code : - 295

Total number of functions : - 12

Language Used : - C Language

Debugger used : - GDB

Profiller used : - Gprof