Assignment #07
0801CS211088

Calculator

Project Objective:

This is a simple calulator that can perform various operations on numbers. This program is developed in C++.

Statistics:

Starting Date: 16/11/2022
End Date: 20/11/2022
Total Days: 5 Days
Total Line of Code : 192

Functions used:

1. add(int num1,int num2: This function adds two numbers which we need to pass as arguements.
2. sub(int num1,int num): This function subtracts two numbers which we need to pass as arguements.
3. mult(int num1,int num2): This function multiplies two numbers which we need to pass as arguements.
4. div(int num1,int num2): This function divides two numbers which we need to pass as arguements.
5. Expcalc(int num1,int num2): This function caclulates the power of a number when passesd as arguements.
6. factorial(int num1): This function calculates the factorial of the fiirst number which is passes as arguement.
7. permutation(int num1,int num2): This function calculates the permutation of two number which we need to pass as arguements.
8. combination(int num1,int num2): This function calculates the permutation of two number which we need to pass as arguements.
9. squareroot(int num1): This function calculates the square root of the first w=number which is passed as arguement.
10. main(): Main function which executes the whole program with the help of switch case.

Program Code:

```
#include<iostream>
#include<conio.h>
#include<math.h>
using namespace std;

/**
 * Function declarations for calculator
 */
float add(float num1, float num2);
float sub(float num1, float num2);
float mult(float num1, float num2);
float div(float num1, float num2);
int Expcalc(int num1, int num2);
int factorial(int num1);
int permutation(int num1, int num2);
float squareroot(int num1);
int combination(int num1, int num2);

int main()
{
    for(int j=0;j<50;j++)
    {
    int op;
    float num1, num2, result=0.0f;
    /* Print welcome message */
    cout<<("\nWELCOME TO SIMPLE CALCULATOR\n");
    cout<<("--------------------------------\n");
    cout<<("Enter [number 1] [number 2]\n");
    cin>>num1>>num2;
    cout<<"What operation do you want to perform ?"<<endl;
    cout<<"1. Addition"<<endl;
    cout<<"2. Subtraction"<<endl;
    cout<<"3. Multiplication"<<endl;
    cout<<"4. Division"<<endl;
    cout<<"5. Factorial"<<endl;
    cout<<"6. Permutation"<<endl;
    cout<<"7. Combination"<<endl;
    cout<<"8. Exponential power calulation"<<endl;
    cout<<"9. Square roots"<<endl;
    cout<<"10. Exit"<<endl;
    cout<<"Enter your choice: ";
    cin>>op;
    if(op==10)
    {
        break;
    }
```

```
    switch(op)
    {
        case 1:
            result = add(num1, num2);
            break;

        case 2:
            result = sub(num1, num2);
            break;

        case 3:
            result = mult(num1, num2);
            break;

        case 4:
            result = div(num1, num2);
            break;
        case 5:
            result = factorial(num1);
            break;
        case 6:
            result = permutation(num1,num2);
            break;
        case 7:
            result = combination(num1, num2);
            break;
        case 8:
            result = Expcalc(num1, num2);
            break;
        case 9:
            result = squareroot(num1);
            break;
        case 10:
            break;
        default:
            cout<<"Invalid operatoion"<<endl;
    }

    cout<<"Result: "<<result;
    getch();
    }
    return 0;
}

/**
 * Function to add two numbers
 */
float add(float num1, float num2)
{
    return num1 + num2;
}
```

```
/**
 * Function to subtract two numbers
 */
float sub(float num1, float num2)
{
    return num1 - num2;
}

/**
 * Function to multiply two numbers
 */
float mult(float num1, float num2)
{
    return num1 * num2;
}

/**
 * Function to divide two numbers
 */
float div(float num1, float num2)
{
    return num1 / num2;
}

/**
 *  Function to find factorial of a number
*/
int factorial(int num1)
{
    int factorial=1;
    for(int i=1;i<=num1;i++)
    {
        factorial=factorial*i;
    }
    return factorial;
}

/**
 *  Function to find Permutation of two numbers
*/
int permutation(int num1, int num2)
{
    int n,r,n_factorial=1,nr_factorial=1;
    n=max(num1,num2);
    r=min(num1,num2);
    for(int i=1;i<=n;i++)
    {
        n_factorial=n_factorial*i;
    }
    for(int i=1;i<=(n-r);i++)
    {
        nr_factorial=nr_factorial*i;
```

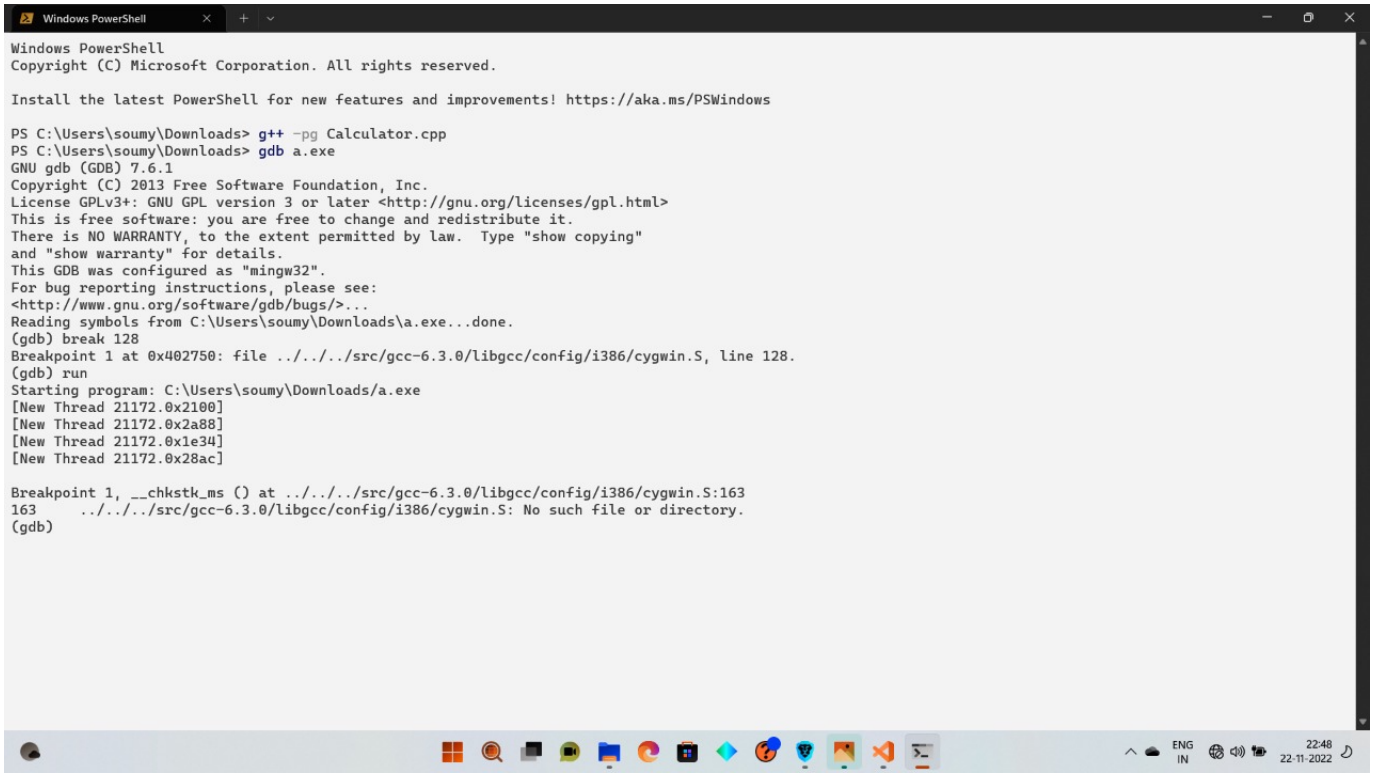
```
    }
    return n_factorial/nr_factorial;
}

/**
 * Function to find Combination of two numbers
*/
int combination(int num1, int num2)
{
     int n,r,n_factorial=1,nr_factorial=1,r_factorial=1;
    n=max(num1,num2);
    r=min(num1,num2);
    for(int i=1;i<=n;i++)
    {
        n_factorial=n_factorial*i;
    }
    for(int i=1;i<=(n-r);i++)
    {
        nr_factorial=nr_factorial*i;
    }
    for(int i=1;i<=r;i++)
    {
        r_factorial=r_factorial*i;
    }
    return n_factorial/(nr_factorial*r_factorial);
}

/**
 * Function to calculate power of a number
*/
int Expcalc(int num1, int num2)
{
    return pow(num1,num2);
}

/**
 * Function to calulate square root of a number
*/
float squareroot(int num1)
{
    return sqrt(num1);
}
```

Debugging: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PS C:\Users\soumy\Downloads> g++ -pg Calculator.cpp
PS C:\Users\soumy\Downloads> gdb a.exe
GNU gdb (GDB) 7.6.1
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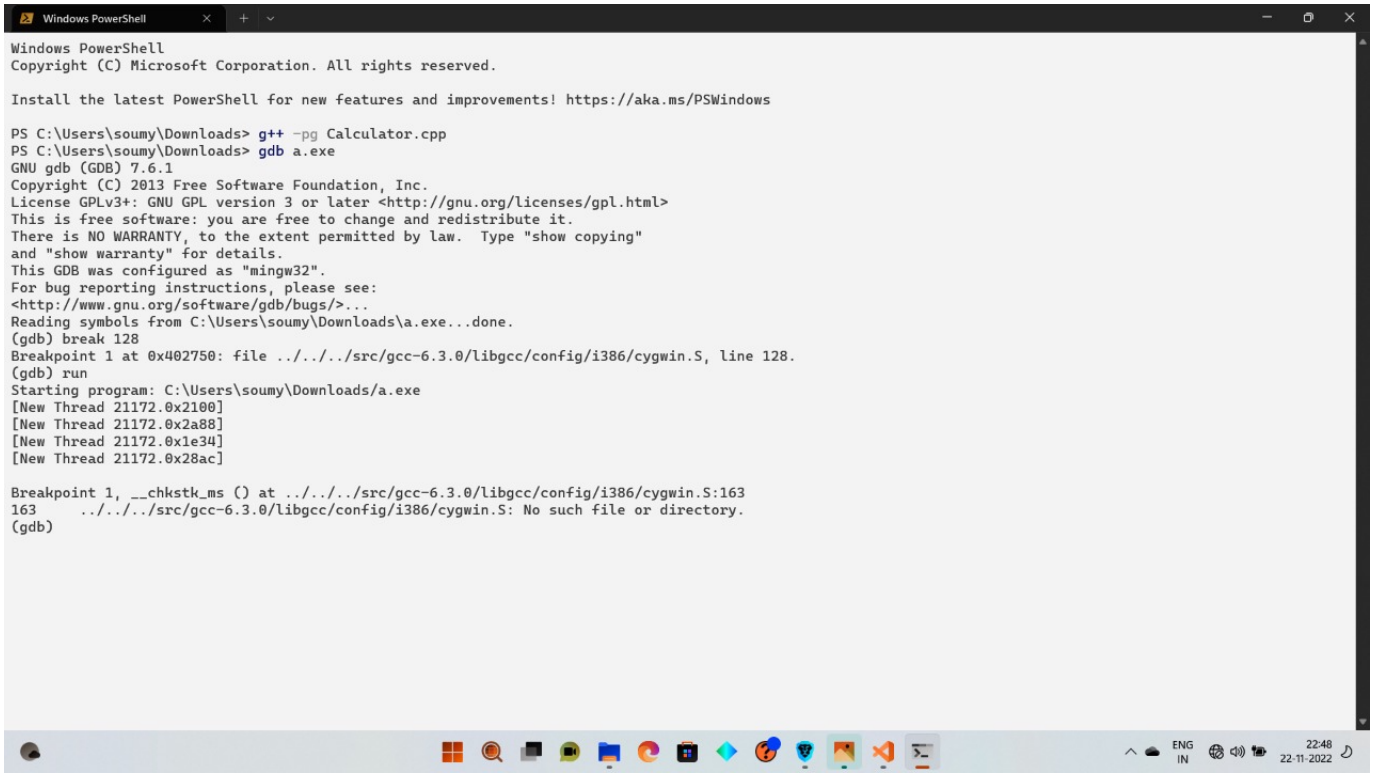
<http://www.gnu.org/software/gdb/bugs/>...
Reading symbols from C:\Users\soumy\Downloads\a.exe...done.
(gdb) break 128
Breakpoint 1 at 0x402750: file ../../../src/gcc-6.3.0/libgcc/config/i386/cygwin.S, line 128.
(gdb) run
Starting program: C:\Users\soumy\Downloads/a.exe
[New Thread 21172.0x2100]
[New Thread 21172.0x2a88]
[New Thread 21172.0x1e34]
[New Thread 21172.0x28ac]
Breakpoint 1, __chkstk_ms () at ../../../src/gcc-6.3.0/libgcc/config/i386/cygwin.S:163
163 ../../../src/gcc-6.3.0/libgcc/config/i386/cygwin.S: No such file or directory.
(gdb)
ENG
IN
22:48
22-11-2022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PS C:\Users\soumy\Downloads> g++ -pg Calculator.cpp
PS C:\Users\soumy\Downloads> gdb a.exe
GNU gdb (GDB) 7.6.1
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Starting program: C:\Users\soumy\Downloads/a.exe
[New Thread 21172.0x2100]
[New Thread 21172.0x2a88]
[New Thread 21172.0x1e34]
[New Thread 21172.0x28ac]
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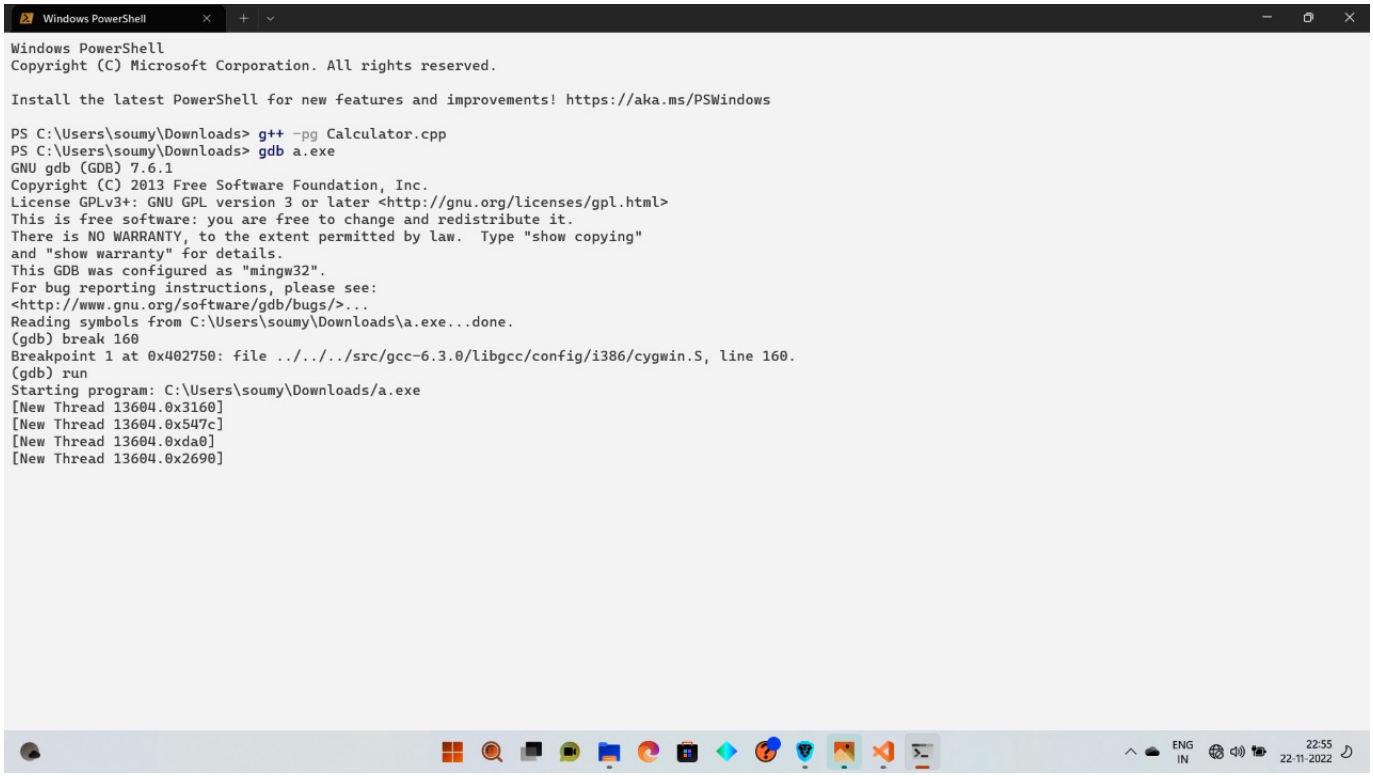
163 ../../../src/gcc-6.3.0/libgcc/config/i386/cygwin.S: No such file or directory.
(gdb)
ENG
IN
22:48
22-11-2022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PS C:\Users\soumy\Downloads> gdb a.exe
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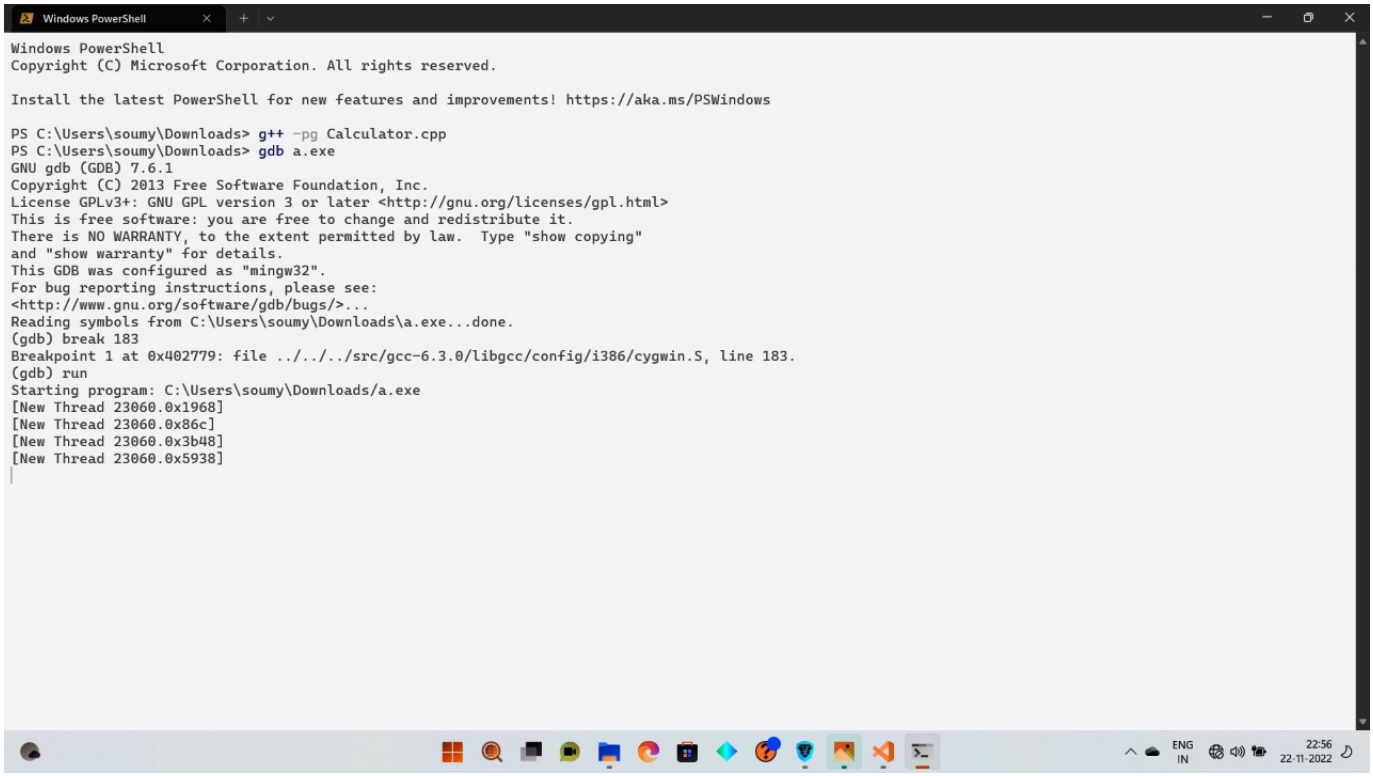
Reading symbols from C:\Users\soumy\Downloads\a.exe...done.
(gdb) break 160
Breakpoint 1 at 0x402750: file ../../../src/gcc-6.3.0/libgcc/config/i386/cygwin.S, line 160.
(gdb) run
Starting program: C:\Users\soumy\Downloads/a.exe
[New Thread 13604.0x3160]
[New Thread 13604.0x547c]
[New Thread 13604.0xda0]
[New Thread 13604.0x2690]
ENG
IN
22:55
22-11-2022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Reading symbols from C:\Users\soumy\Downloads\a.exe...done.
(gdb) break 183
Breakpoint 1 at 0x402779: file ../../../src/gcc-6.3.0/libgcc/config/i386/cygwin.S, line 183.
(gdb) run
Starting program: C:\Users\soumy\Downloads/a.exe
[New Thread 23060.0x1968]
[New Thread 23060.0x86c]
[New Thread 23060.0x3b48]
[New Thread 23060.0x5938]
ENG
IN
22:56
22-11-2022

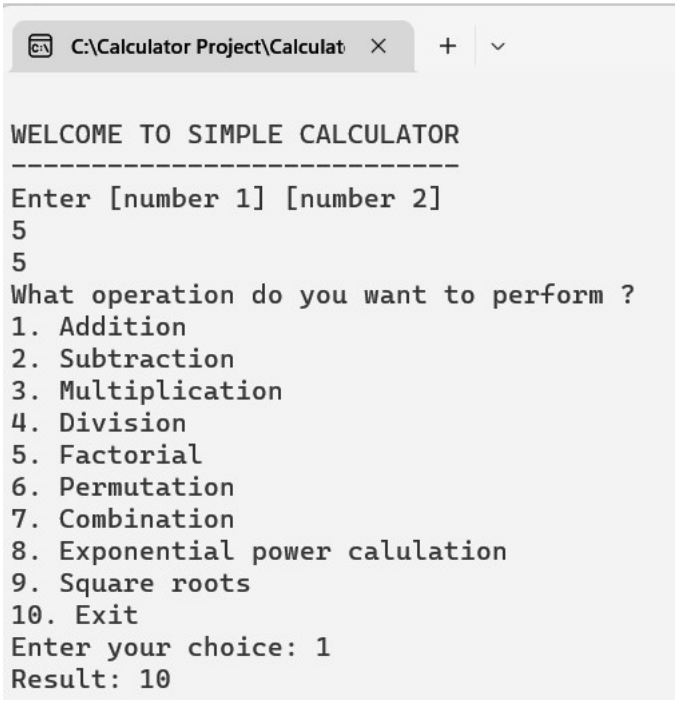
Profiling:

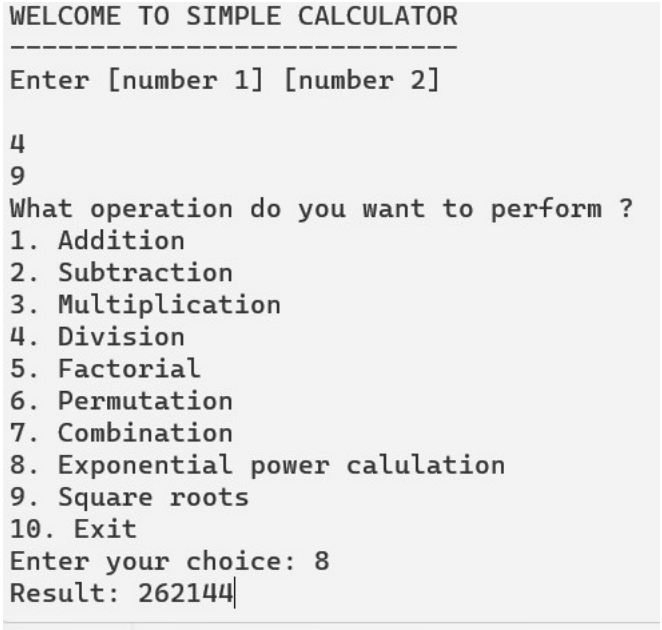
```
Flat profile:

Each sample counts as 0.01 seconds.
 no time accumulated

  %   cumulative   self              self     total
 time   seconds   seconds    calls  Ts/call  Ts/call  name
  0.00      0.00     0.00        1     0.00     0.00  deregister_tm_clones
  0.00      0.00     0.00        1     0.00     0.00  register_tm_clones
```

```
               Call graph (explanation follows)


granularity: each sample hit covers 2 byte(s) no time propagated

index % time    self  children    called     name
                0.00    0.00       1/1           register_tm_clones [2]
[1]      0.0    0.00    0.00       1          deregister_tm_clones [1]
-----------------------------------------------
                0.00    0.00       1/1           frame_dummy [4]
[2]      0.0    0.00    0.00       1          register_tm_clones [2]
                0.00    0.00       1/1           deregister_tm_clones [1]
-----------------------------------------------
```

```
Index by function name

   [1] deregister_tm_clones    [2] register_tm_clones
```

Program Output:





```
WELCOME TO SIMPLE CALCULATOR
----------------------------
Enter [number 1] [number 2]
7
9
What operation do you want to perform ?
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Factorial
6. Permutation
7. Combination
8. Exponential power calulation
9. Square roots
10. Exit
Enter your choice: 5
Result: 5040
```

```
WELCOME TO SIMPLE CALCULATOR
----------------------------
Enter [number 1] [number 2]
8
6
What operation do you want to perform ?
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Factorial
6. Permutation
7. Combination
8. Exponential power calulation
9. Square roots
10. Exit
Enter your choice: 6
Result: 20160
```