School Of Mechanical & Manufacturing Engineering (NUST)

Department of Mechanical Engineering

Lab Report #05:

Prepared by

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Lab Task:

Question # 01: Convert the following while loop to a do-while loop:

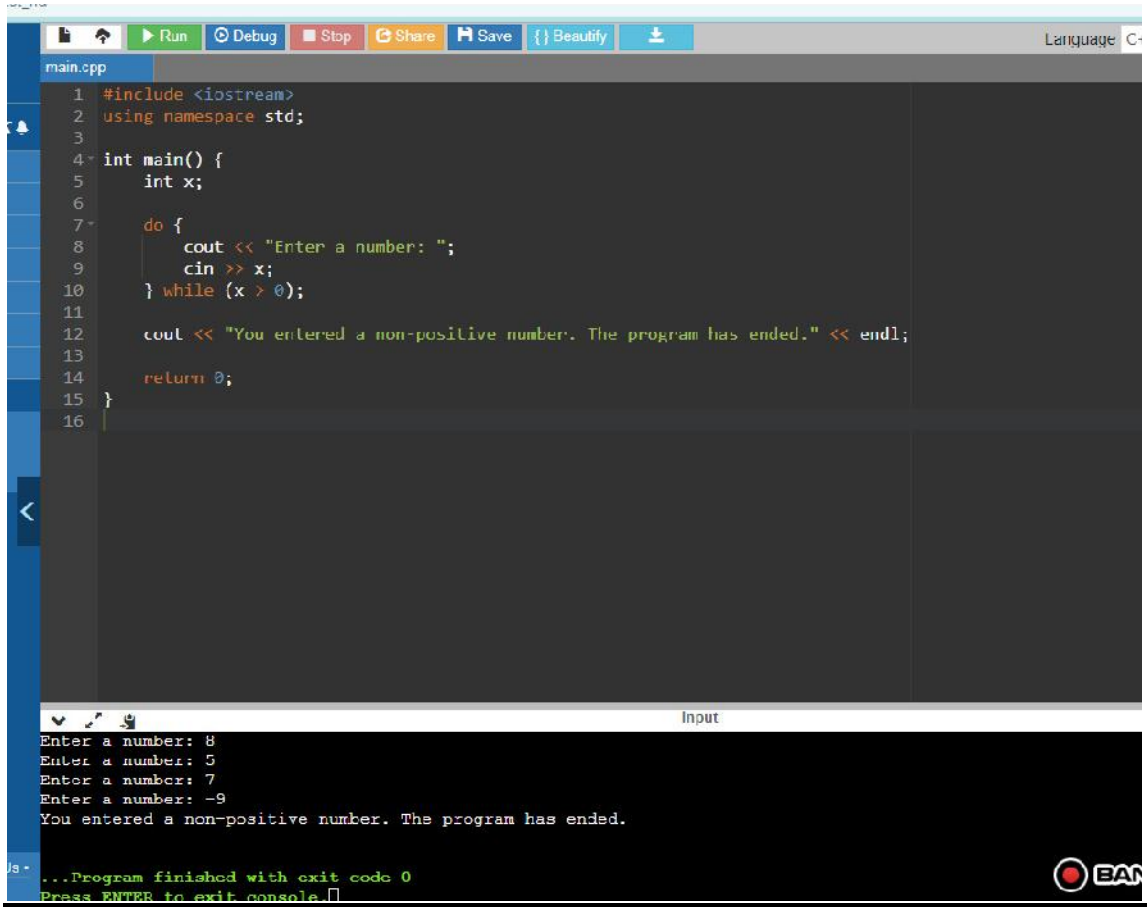
```
int x = 1;
while (x > 0)
{
cout << "enter
a number: ";
cin >> x;
```

Input:

```
#include <iostream>

using namespace std;


int main() {

   int x;
```

```
    do {
        cout << "Enter a number: ";
        cin >> x;
    } while (x > 0);

    cout << "You entered a non-positive number. The program has ended." << endl;

    return 0;
}
```

Output:



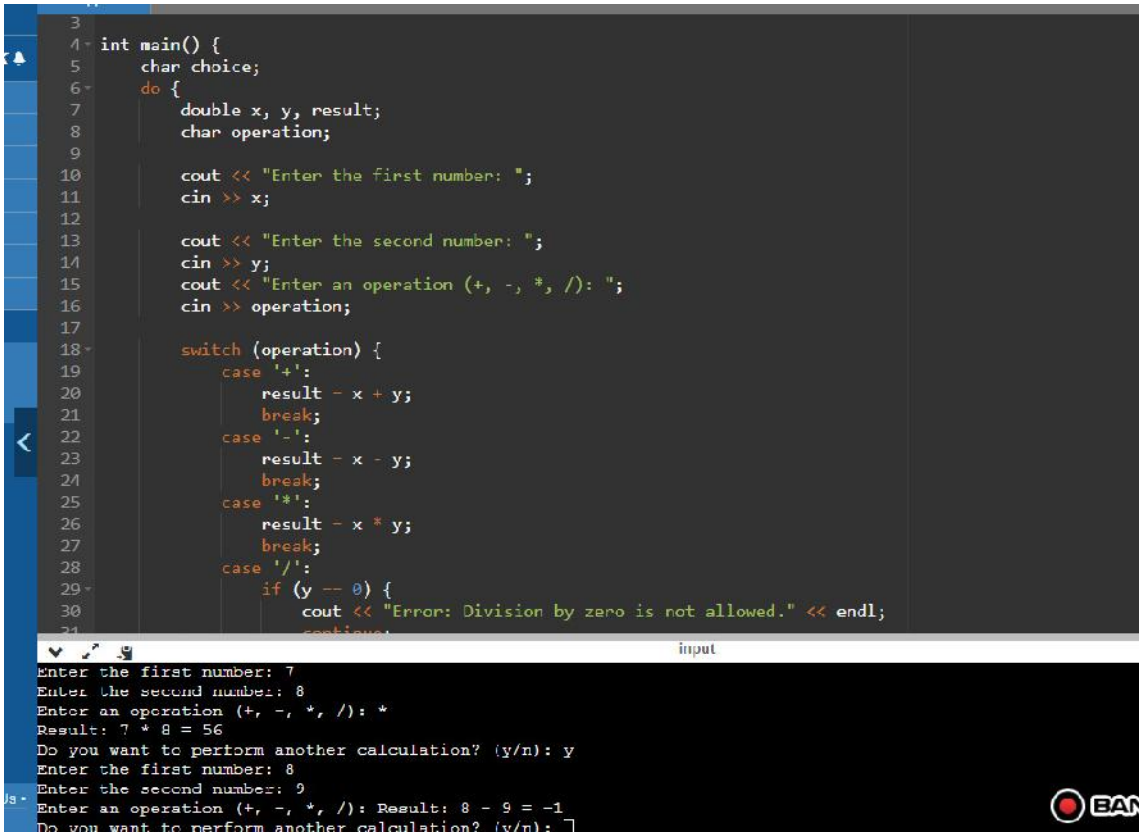
Question #02: Use a do while loop to make a simple calculator for two numbers. Insert buttons for it to ask again and for termination.

Input:

```
int main() {
   char choice;
   do {
      double x, y, result;
```

```
    char operation;

    cout << "Enter the first number: ";
    cin >> x;

    cout << "Enter the second number: ";
    cin >> y;
    cout << "Enter an operation (+, -, *, /): ";
    cin >> operation;

    switch (operation) {
        case '+':
            result = x + y;
            break;
        case '-':
            result = x - y;
            break;
        case '*':
            result = x * y;
            break;
        case '/':
            if (y == 0) {
                cout << "Error: Division by zero is not allowed." << endl;
                continue;
            }
            result = x / y;
            break;
        default:
            cout << "Invalid operation. Please enter +, -, *, or /." << endl;
            continue;
    }

    cout << "Result: " << x << " " << operation << " " << y << " = " << result << endl;

    cout << "Do you want to perform another calculation? (y/n): ";
    cin >> choice;

  } while (choice == 'y' );

  cout << "Calculator terminated. Thank you for using it." << endl;

  return 0;
}
```

Output:



```
int main() {
    char choice;
    do {
        double x, y, result;
        char operation;

        cout << "Enter the first number: ";
        cin >> x;

        cout << "Enter the second number: ";
        cin >> y;
        cout << "Enter an operation (+, -, *, /): ";
        cin >> operation;

        switch (operation) {
            case '+':
                result = x + y;
                break;
            case '-':
                result = x - y;
                break;
            case '*':
                result = x * y;
                break;
            case '/':
                if (y == 0) {
                    cout << "Error: Division by zero is not allowed." << endl;
```

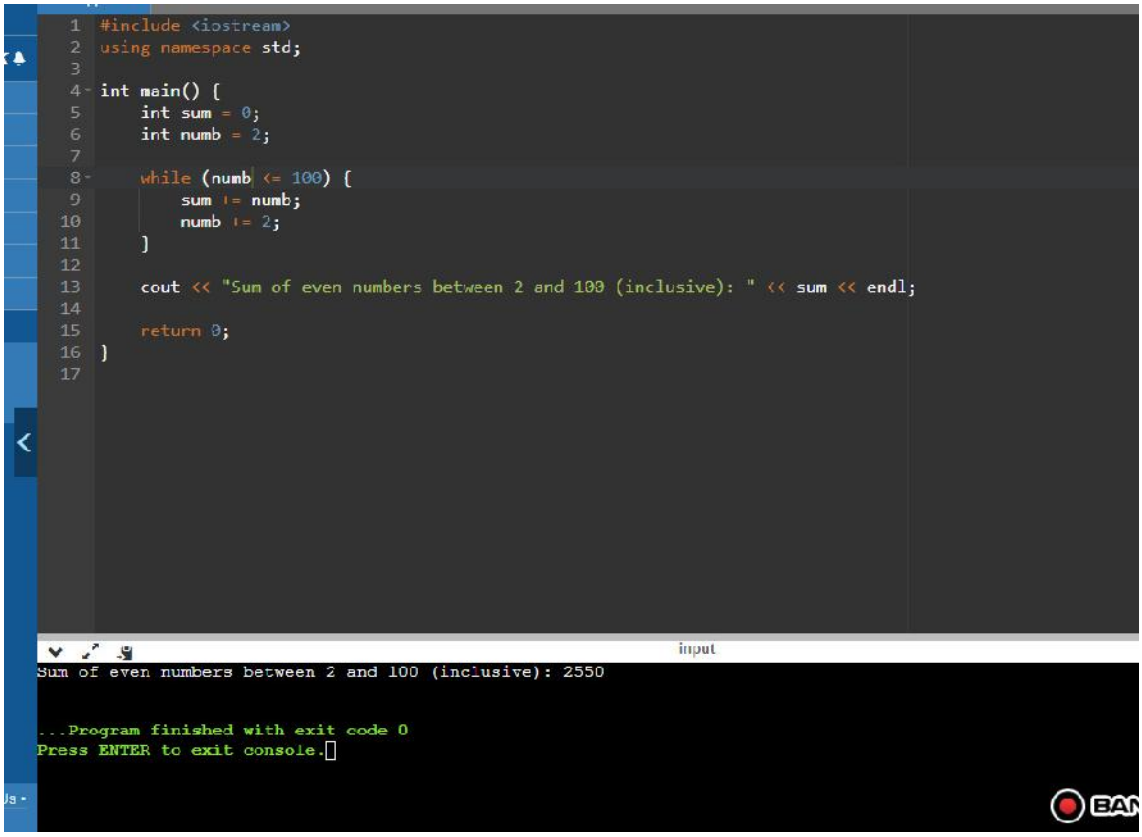
input

```
Enter the first number: 7
Enter the second number: 8
Enter an operation (+, -, *, /): *
Result: 7 * 8 = 56
Do you want to perform another calculation? (y/n): y
Enter the first number: 8
Enter the second number: 9
Enter an operation (+, -, *, /): Result: 8 - 9 = -1
Do you want to perform another calculation? (y/n):
```

Question #03: Write programs with while or do while loops that compute:
a. The sum of all even numbers between 2 and 100 (inclusive).
b. The sum of all squares between 1 and 100 (inclusive).
Input (a):

```
#include <iostream>
using namespace std;

int main() {
   int sum = 0;
   int numb = 2;

   while (numb <= 100) {
      sum += numb;
      numb += 2;
   }

   cout << "Sum of even numbers between 2 and 100 (inclusive): " << sum << endl;

   return 0;
}
```

Output:

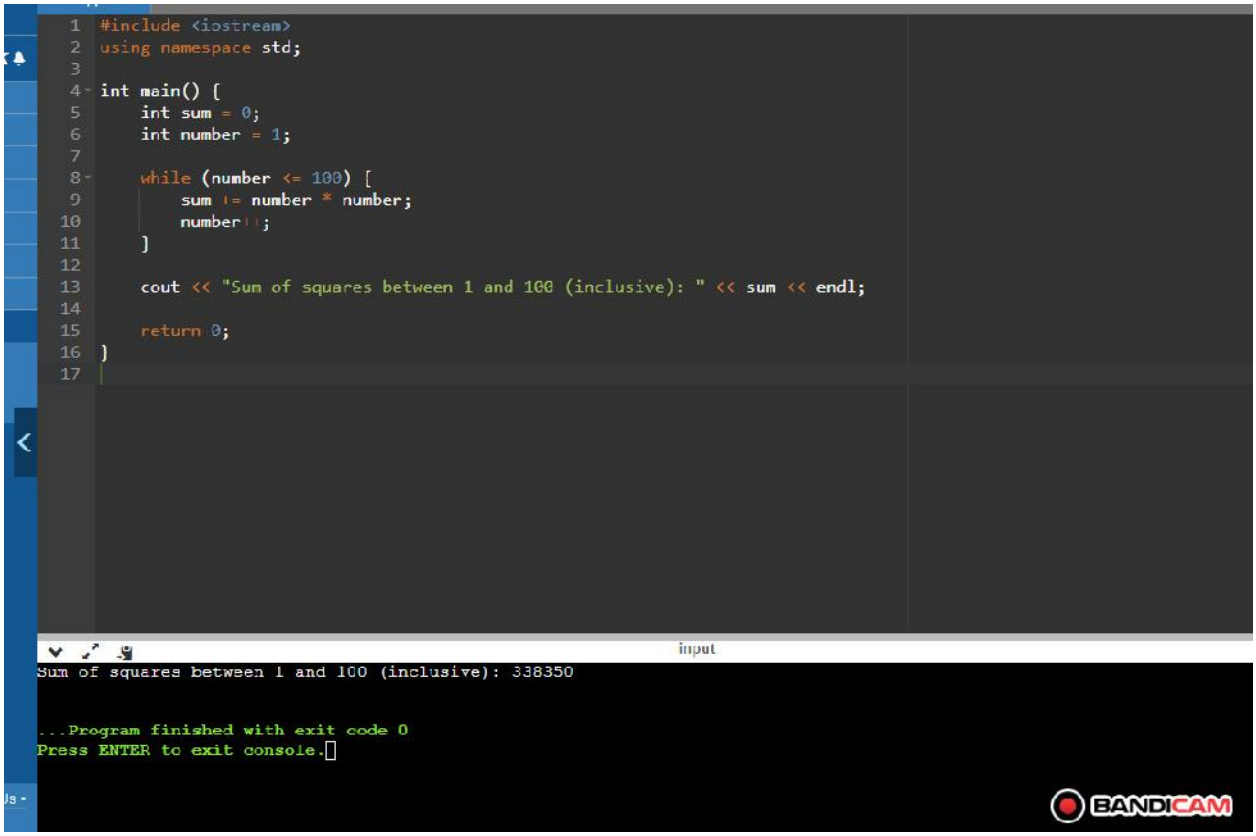


Input(b):

```
#include <iostream>
using namespace std;

int main() {
   int sum = 0;
   int number = 1;

   while (number <= 100) {
```

```
        sum += number * number;
        number++;
    }

    cout << "Sum of squares between 1 and 100 (inclusive): " << sum << endl;

    return 0;
}
```

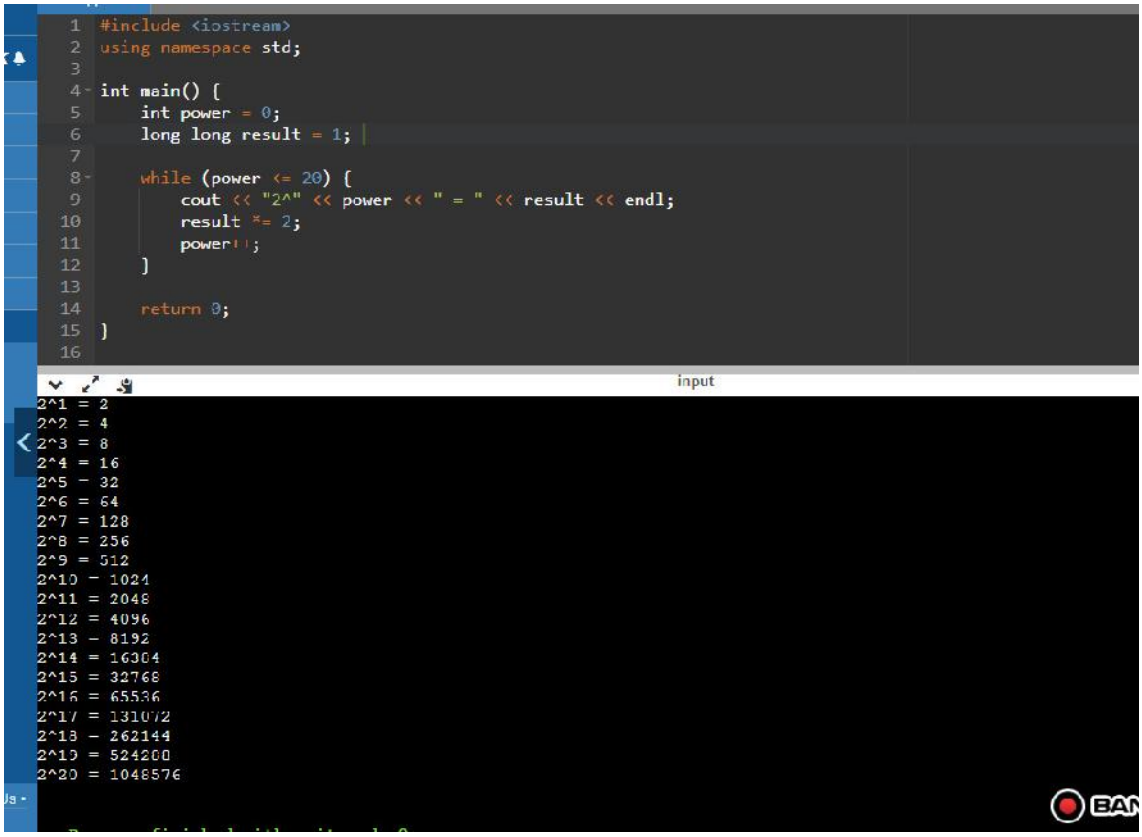
Output:



4. Write programs with while or do while loops that compute:
a. All powers of 2 from 2 up to 2
b. The sum of all odd numbers between a and b (inclusive), where a and b are inputs.
Input(a):

```
#include <iostream>
using namespace std;

int main() {
   int pow = 0;
   long long result = 1;
   while (pow <= 20) {
      cout << "2^" << pow << " = " << result << endl;
      result *= 2;
      pow++;
   }

   return 0;
}
```

Output:



```
#include <iostream>
using namespace std;

int main() {
    int power = 0;
    long long result = 1;

    while (power <= 20) {
        cout << "2^" << power << " = " << result << endl;
        result *= 2;
        power++;
    }

    return 0;
}
```

input

```
2^1 = 2
2^2 = 4
2^3 = 8
2^4 = 16
2^5 = 32
2^6 = 64
2^7 = 128
2^8 = 256
2^9 = 512
2^10 = 1024
2^11 = 2048
2^12 = 4096
2^13 = 8192
2^14 = 16384
2^15 = 32768
2^16 = 65536
2^17 = 131072
2^18 = 262144
2^19 = 524288
2^20 = 1048576
```

Input (b):

```
#include <iostream>
using namespace std;

int main() {
    int a, b;

    cout << "Enter the starting value (a): ";
    cin >> a;

    cout << "Enter the ending value (b): ";
    cin >> b;

    int sum = 0;
    int current = (a % 2 == 0) ? a + 1 : a;
    while (current <= b) {
```

```
        sum += current;
        current += 2;    }

    cout << "Sum of odd numbers between " << a << " and " << b << " (inclusive): " << sum <<
endl;

    return 0;
}
```

Output: