



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;
```

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```
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:

A screenshot of a C++ IDE interface. The top toolbar includes buttons for Run, Debug, Stop, Share, Save, Beautify, and a download icon. The language is set to C++. The editor shows a file named 'main.cpp' with the following code:

```
1 #include <iostream>
2 using namespace std;
3
4 int main() {
5     int x;
6
7     do {
8         cout << "Enter a number: ";
9         cin >> x;
10    } while (x > 0);
11
12    cout << "You entered a non-positive number. The program has ended." << endl;
13
14    return 0;
15 }
16
```

The bottom console window shows the program's execution with the following input and output:

```
Enter a number: 8
Enter a number: 5
Enter a number: 7
Enter a number: -9
You entered a non-positive number. The program has ended.
...Program finished with exit code 0
Press ENTER to exit console.
```

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;
```

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```
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:
```

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```
3
4 int main() {
5     char choice;
6     do {
7         double x, y, result;
8         char operation;
9
10        cout << "Enter the first number: ";
11        cin >> x;
12
13        cout << "Enter the second number: ";
14        cin >> y;
15        cout << "Enter an operation (+, -, *, /): ";
16        cin >> operation;
17
18        switch (operation) {
19            case '+':
20                result = x + y;
21                break;
22            case '-':
23                result = x - y;
24                break;
25            case '*':
26                result = x * y;
27                break;
28            case '/':
29                if (y == 0) {
30                    cout << "Error: Division by zero is not allowed." << endl;
31                    continue;
32                }
33                result = x / y;
34                break;
35            default:
36                cout << "Invalid operation." << endl;
37                continue;
38        }
39        cout << "Result: " << result << endl;
40        cout << "Do you want to perform another calculation? (y/n): ";
41        cin >> choice;
42    } while (choice == 'y' || choice == 'Y');
43}
```

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):

The EAS logo is located in the bottom right corner of the code editor window. It consists of a red circle with a white dot in the center, followed by the letters 'EAS' in a bold, sans-serif font.



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:



```
1 #include <iostream>
2 using namespace std;
3
4 int main() {
5     int sum = 0;
6     int numb = 2;
7
8     while (numb <= 100) {
9         sum += numb;
10        numb += 2;
11    }
12
13    cout << "Sum of even numbers between 2 and 100 (inclusive): " << sum << endl;
14
15    return 0;
16 }
17
```

input

Sum of even numbers between 2 and 100 (inclusive): 2550

...Program finished with exit code 0
Press ENTER to exit console.

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:
```

A screenshot of a C++ program being executed. The top part shows the source code in a dark-themed editor with line numbers 1 through 17. The code includes <iostream>, uses the std namespace, and defines a main function. Inside main, it initializes sum to 0 and number to 1, then enters a while loop that calculates the sum of squares from 1 to 100. After the loop, it prints the result and returns 0. The bottom part of the screenshot shows the program's output in a console window, displaying the sum 338350 and a message indicating the program finished successfully. A Bandicam watermark is visible in the bottom right corner of the screenshot.

```
1 #include <iostream>
2 using namespace std;
3
4 int main() {
5     int sum = 0;
6     int number = 1;
7
8     while (number <= 100) {
9         sum += number * number;
10        number++;
11    }
12
13    cout << "Sum of squares between 1 and 100 (inclusive): " << sum << endl;
14
15    return 0;
16 }
17
```

input

Sum of squares between 1 and 100 (inclusive): 338350

...Program finished with exit code 0
Press ENTER to exit console.

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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:



```
1 #include <iostream>
2 using namespace std;
3
4 int main() {
5     int power = 0;
6     long long result = 1;
7
8     while (power <= 20) {
9         cout << "2^" << power << " = " << result << endl;
10        result *= 2;
11        power++;
12    }
13
14    return 0;
15 }
16
```

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) {
```

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

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

```
return 0;  
}  
Output:
```

A screenshot of a C++ program being executed. The top part shows the source code in a dark-themed editor with line numbers 10 to 25. The code calculates the sum of odd numbers between two values 'a' and 'b'. The bottom part shows the console output where 'a' is 6 and 'b' is 88, resulting in a sum of 1927. The program ends with an exit code of 0. A 'BANDICAM' watermark is visible in the bottom right corner.

```
main.cpp  
10  cout << "Enter the ending value (b): ";  
11  cin >> b;  
12  
13  int sum = 0;  
14  int current = (a % 2 == 0) ? a + 1 : a; // Start with the nearest odd number  
15  
16  while (current <= b) {  
17      sum += current;  
18      current += 2; // Move to the next odd number  
19  }  
20  
21  cout << "Sum of odd numbers between " << a << " and " << b << " (inclusive): " << sum << endl;  
22  
23  return 0;  
24  }  
25  
input  
Enter the starting value (a): 6  
Enter the ending value (b): 88  
< Sum of odd numbers between 6 and 88 (inclusive): 1927  
  
...Program finished with exit code 0  
Press ENTER to exit console.  
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```