

## Chapter 2

### Lab 2.1.5 (1)

```
common year[ec2-user@ip-172-31-82-95 Lab 2.1.5 (1)]$ g++ -lm -o output Lab*.cpp
[ec2-user@ip-172-31-82-95 Lab 2.1.5 (1)]$ ./output
Enter a year: 2000
leap year[ec2-user@ip-172-31-82-95 Lab 2.1.5 (1)]$ ./output
Enter a year: 2015
common year[ec2-user@ip-172-31-82-95 Lab 2.1.5 (1)]$ ./output
Enter a year: 1999
common year[ec2-user@ip-172-31-82-95 Lab 2.1.5 (1)]$ ./output
Enter a year: 1996
leap year[ec2-user@ip-172-31-82-95 Lab 2.1.5 (1)]$ ./output
Enter a year: 1900
common year[ec2-user@ip-172-31-82-95 Lab 2.1.5 (1)]$ ./output
Enter a year: 2017
common year[ec2-user@ip-172-31-82-95 Lab 2.1.5 (1)]$
```

### Lab 2.1.5 (2)

```
[ec2-user@ip-172-31-82-95 Lab 2.1.5 (2)]$ g++ -lm -o output Lab*.cpp
[ec2-user@ip-172-31-82-95 Lab 2.1.5 (2)]$ ./output
Enter a gross price: 123
Enter a tax rate: 23
Net price: 100
Tax value: 23
[ec2-user@ip-172-31-82-95 Lab 2.1.5 (2)]$ ./output
Enter a gross price: 123
Enter a tax rate: 50
Net price: 82
Tax value: 41
[ec2-user@ip-172-31-82-95 Lab 2.1.5 (2)]$ ./output
Enter a gross price: 123
Enter a tax rate: 98
Net price: 62.1212
Tax value: 60.8788
[ec2-user@ip-172-31-82-95 Lab 2.1.5 (2)]$ ./output
Enter a gross price: 11
Enter a tax rate: 10
Net price: 10
Tax value: 1
[ec2-user@ip-172-31-82-95 Lab 2.1.5 (2)]$ ./output
Enter a gross price: 42
Enter a tax rate: 10
Net price: 38.1818
Tax value: 3.81818
[ec2-user@ip-172-31-82-95 Lab 2.1.5 (2)]$
```

### Lab 2.1.5 (3)

```

[ec2-user@ip-172-31-82-95 Lab 2.1.5 (3)]$ g++ -lm -o output Lab*.cpp
[ec2-user@ip-172-31-82-95 Lab 2.1.5 (3)]$ ./output
System (0 for metric / 1 for imperial)
0
m: 1
3'3.37008"
[ec2-user@ip-172-31-82-95 Lab 2.1.5 (3)]$ ./output
System (0 for metric / 1 for imperial)
1
ft: 3
in: 3.37008
lm[ec2-user@ip-172-31-82-95 Lab 2.1.5 (3)]$ ./output
System (0 for metric / 1 for imperial)
0
m: 0.0254
0'1"
[ec2-user@ip-172-31-82-95 Lab 2.1.5 (3)]$ ./output
System (0 for metric / 1 for imperial)
1
ft: 0
in: 1
0.0254m[ec2-user@ip-172-31-82-95 Lab 2.1.5 (3)]$ ./output
System (0 for metric / 1 for imperial)
0
m: 180
590'6.61417"
[ec2-user@ip-172-31-82-95 Lab 2.1.5 (3)]$ █

```

Lab 2.1.5 (4)

```

[ec2-user@ip-172-31-82-95 Lab 2.1.5 (4)]$ g++ -lm -o output Lab*.cpp
[ec2-user@ip-172-31-82-95 Lab 2.1.5 (4)]$ ./output
Year: 2016
Month: 2
Day: 10
Wednesday(3) [ec2-user@ip-172-31-82-95 Lab 2.1.5 (4)]$ ./output
Year: 2000
Month: 1
Day: 1
Saturday(6) [ec2-user@ip-172-31-82-95 Lab 2.1.5 (4)]$ ./output
Year: 1999
Month: 12
Day: 31
Friday(5) [ec2-user@ip-172-31-82-95 Lab 2.1.5 (4)]$ ./output
Year: 1964
Month: 12
Day: 21
Monday(1) [ec2-user@ip-172-31-82-95 Lab 2.1.5 (4)]$ ./output
Year: 2017
Month: 12
Day: 20
Wednesday(3) [ec2-user@ip-172-31-82-95 Lab 2.1.5 (4)]$ █

```

Lab 2.1.5 (5)

```
[ec2-user@ip-172-31-82-95 Lab 2.1.5 (5)]$ g++ -lm -o output Lab*.cpp
[ec2-user@ip-172-31-82-95 Lab 2.1.5 (5)]$ ./output
Year: 2016
March 27[ec2-user@ip-172-31-82-95 Lab 2.1.5 (5)]$ ./output
Year: 1980
April 6[ec2-user@ip-172-31-82-95 Lab 2.1.5 (5)]$ ./output
Year: 2026
April 5[ec2-user@ip-172-31-82-95 Lab 2.1.5 (5)]$ ./output
Year: 2018
April 1[ec2-user@ip-172-31-82-95 Lab 2.1.5 (5)]$
```

### Lab 2.3.19 (1)

```
[ec2-user@ip-172-31-82-95 Lab 2.3.19 (1)]$ g++ -lm -o output Lab*.cpp
[ec2-user@ip-172-31-82-95 Lab 2.3.19 (1)]$ ./output
Input number: 15
46
23
70
35
106
53
160
80
40
20
10
5
16
8
4
2
1
Steps: 17[ec2-user@ip-172-31-82-95 Lab 2.3.19 (1)]$ ./output
Input number: 16
8
4
2
1
Steps: 4[ec2-user@ip-172-31-82-95 Lab 2.3.19 (1)]$ ./output
Input number: 1023
3070
1535
4606
```

4606  
2303  
6910  
3455  
10366  
5183  
15550  
7775  
23326  
11663  
34990  
17495  
52486  
26243  
78730  
39365  
118096  
59048  
29524  
14762  
7381  
22144  
11072  
5536  
2768  
1384  
692  
346  
173  
520  
260  
130  
65  
196  
98  
49  
148

```

148
74
37
112
56
28
14
7
22
11
34
17
52
26
13
40
20
10
5
16
8
4
2
1
Steps: 62[ec2-user@ip-172-31-82-95 Lab 2.3.19 (1)]$ ./output
Input number: 42
21
64
32
16
8
4
2
1
Steps: 8[ec2-user@ip-172-31-82-95 Lab 2.3.19 (1)]$ █

```

Lab 2.3.19 (2)

```

[ec2-user@ip-172-31-82-95 Lab 2.3.19 (2)]$ g++ -lm -o output Lab*.cpp
[ec2-user@ip-172-31-82-95 Lab 2.3.19 (2)]$ ./output
Number of iterations? 10000
Pi = 3.141542653589820322
[ec2-user@ip-172-31-82-95 Lab 2.3.19 (2)]$ ./output
Number of iterations? 1000000
Pi = 3.141592153589901848
[ec2-user@ip-172-31-82-95 Lab 2.3.19 (2)]$ ./output
Number of iterations? 1000000000
Pi = 3.141592644576215676
[ec2-user@ip-172-31-82-95 Lab 2.3.19 (2)]$ ./output
Number of iterations? 10
Pi = 3.0916238066678385366
[ec2-user@ip-172-31-82-95 Lab 2.3.19 (2)]$ █

```

Lab 2.3.19 (3)

```
[ec2-user@ip-172-31-82-95 Lab 2.3.19 (3)]$ g++ -lm -o output Lab*.cpp
[ec2-user@ip-172-31-82-95 Lab 2.3.19 (3)]$ ./output
Input power: 8
Exp: 256[ec2-user@ip-172-31-82-95 Lab 2.3.19 (3)]$ ./output
Input power: 16
Exp: 65536[ec2-user@ip-172-31-82-95 Lab 2.3.19 (3)]$ ./output
Input power: 32
Exp: 4294967296[ec2-user@ip-172-31-82-95 Lab 2.3.19 (3)]$ ./output
Input power: 63
Exp: 9223372036854775808[ec2-user@ip-172-31-82-95 Lab 2.3.19 (3)]$ ./output
Input power: 4
Exp: 16[ec2-user@ip-172-31-82-95 Lab 2.3.19 (3)]$
```

Lab 2.3.19 (4)

```
[ec2-user@ip-172-31-82-95 Lab 2.3.19 (4)]$ g++ -lm -o output Lab*.cpp
[ec2-user@ip-172-31-82-95 Lab 2.3.19 (4)]$ ./output
Input power: 0
Exp: 1[ec2-user@ip-172-31-82-95 Lab 2.3.19 (4)]$ ./output
Input power: 1
Exp: 0.5[ec2-user@ip-172-31-82-95 Lab 2.3.19 (4)]$ ./output
Input power: 8
Exp: 0.00390625[ec2-user@ip-172-31-82-95 Lab 2.3.19 (4)]$ ./output
Input power: 10
Exp: 0.0009765625[ec2-user@ip-172-31-82-95 Lab 2.3.19 (4)]$ ./output
Input power: 42
Exp: 2.2737367544323205948e-13[ec2-user@ip-172-31-82-95 Lab 2.3.19 (4)]$
```

Lab 2.3.19 (5)

```

[ec2-user@ip-172-31-82-95 Lab 2.3.19 (5)]$ g++ -lm -o output Lab*.cpp
[ec2-user@ip-172-31-82-95 Lab 2.3.19 (5)]$ ./output
Side size (2 to 20): 3
+-+
| |
+-+
[ec2-user@ip-172-31-82-95 Lab 2.3.19 (5)]$ ./output
Side size (2 to 20): 8
+-----+
|       |
|       |
|       |
|       |
|       |
|       |
+-----+
[ec2-user@ip-172-31-82-95 Lab 2.3.19 (5)]$ ./output
Side size (2 to 20): 100
Sorry, the side size is too big
Side size (2 to 20): 5
+---+
|   |
|   |
|   |
+---+
[ec2-user@ip-172-31-82-95 Lab 2.3.19 (5)]$

```

Lab 2.3.19 (6)

```

[ec2-user@ip-172-31-82-95 Lab 2.3.19 (6)]$ g++ -lm -o output Lab*.cpp
[ec2-user@ip-172-31-82-95 Lab 2.3.19 (6)]$ ./output
Input size of piramid(3-8): 3
      *           *           *
     * *         * *         * *
    *****      *****      *****
[ec2-user@ip-172-31-82-95 Lab 2.3.19 (6)]$ ./output
Input size of piramid(3-8): 8
      *           *           *
     * *         * *         * *
    *   *       *   *       *   *
   *     *     *     *     *     *
  *       *   *       *   *       *
 *         * *         * *         *
*           *           *           *
*****      *****      *****
[ec2-user@ip-172-31-82-95 Lab 2.3.19 (6)]$ ./output
Input size of piramid(3-8): 1
Wrong size
Input size of piramid(3-8): 5
      *           *           *
     * *         * *         * *
    *   *       *   *       *   *
   *     *     *     *     *     *
  *       *   *       *   *       *
 *         *           *           *
*****      *****      *****
[ec2-user@ip-172-31-82-95 Lab 2.3.19 (6)]$

```

### Lab 2.3.19 (7)

```
[ec2-user@ip-172-31-82-95 Lab 2.3.19 (7)]$ g++ -lm -o output Lab*.cpp
[ec2-user@ip-172-31-82-95 Lab 2.3.19 (7)]$ ./output
Fibonacci number: 8
F = 21
[ec2-user@ip-172-31-82-95 Lab 2.3.19 (7)]$ ./output
Fibonacci number: 20
F = 6765
[ec2-user@ip-172-31-82-95 Lab 2.3.19 (7)]$ ./output
Fibonacci number: 55
F = 139583862445
[ec2-user@ip-172-31-82-95 Lab 2.3.19 (7)]$ ./output
Fibonacci number: 5
F = 5
[ec2-user@ip-172-31-82-95 Lab 2.3.19 (7)]$
```

### Lab 2.3.19 (8)

```
[ec2-user@ip-172-31-82-95 Lab 2.3.19 (8)]$ g++ -lm -o output Lab*.cpp
[ec2-user@ip-172-31-82-95 Lab 2.3.19 (8)]$ ./output
n = 5
n! = 120
[ec2-user@ip-172-31-82-95 Lab 2.3.19 (8)]$ ./output
n = 10
n! = 3628800
[ec2-user@ip-172-31-82-95 Lab 2.3.19 (8)]$ ./output
n = 20
n! = 2432902008176640000
[ec2-user@ip-172-31-82-95 Lab 2.3.19 (8)]$ ./output
n = 100
n! = 0
[ec2-user@ip-172-31-82-95 Lab 2.3.19 (8)]$
```

### Lab 2.3.19 (9)

```
[ec2-user@ip-172-31-82-95 Lab 2.3.19 (9)]$ g++ -lm -o output Lab*.cpp
[ec2-user@ip-172-31-82-95 Lab 2.3.19 (9)]$ ./output
n = 3
Bottom right = 5
[ec2-user@ip-172-31-82-95 Lab 2.3.19 (9)]$ ./output
n = 5
Bottom right = 17
[ec2-user@ip-172-31-82-95 Lab 2.3.19 (9)]$ ./output
n = 11
Bottom right = 101
[ec2-user@ip-172-31-82-95 Lab 2.3.19 (9)]$ ./output
n = 11111
Bottom right = 123432101
[ec2-user@ip-172-31-82-95 Lab 2.3.19 (9)]$ ./output
n = 42
Bottom right = 1682
[ec2-user@ip-172-31-82-95 Lab 2.3.19 (9)]$
```

### Lab 2.4.23 (1)



```
[ec2-user@ip-172-31-82-95 Lab 2.4.23 (1)]$ g++ -lm -o output Lab*.cpp
[ec2-user@ip-172-31-82-95 Lab 2.4.23 (1)]$ ./output
Numb: 15
4
[ec2-user@ip-172-31-82-95 Lab 2.4.23 (1)]$ ./output
Numb: 65536
1
[ec2-user@ip-172-31-82-95 Lab 2.4.23 (1)]$ ./output
Numb: 2222222
10
[ec2-user@ip-172-31-82-95 Lab 2.4.23 (1)]$ ./output
Numb: 42
3
[ec2-user@ip-172-31-82-95 Lab 2.4.23 (1)]$
```

#### Lab 2.4.23 (2)

```
[ec2-user@ip-172-31-82-95 Lab 2.4.23 (2)]$ g++ -lm -o output Lab*.cpp
[ec2-user@ip-172-31-82-95 Lab 2.4.23 (2)]$ ./output
value = 0
0 is a bitwise palindrome
[ec2-user@ip-172-31-82-95 Lab 2.4.23 (2)]$ ./output
value = 65536
65535 is a bitwise palindrome
[ec2-user@ip-172-31-82-95 Lab 2.4.23 (2)]$ ./output
value = 21930
21930 is a bitwise palindrome
[ec2-user@ip-172-31-82-95 Lab 2.4.23 (2)]$ ./output
value = 21929
21929 is not a bitwise palindrome
[ec2-user@ip-172-31-82-95 Lab 2.4.23 (2)]$ ./output
value = 42
42 is not a bitwise palindrome
[ec2-user@ip-172-31-82-95 Lab 2.4.23 (2)]$
```

#### Lab 2.5.4 (1)

```
[ec2-user@ip-172-31-82-95 Lab 2.5.4 (1)]$ g++ -lm -o output Lab*.cpp
[ec2-user@ip-172-31-82-95 Lab 2.5.4 (1)]$ ./output
MENU:
0 - exit
1 - addition
2 - subtraction
3 - multiplication
4 - division
Your choice : 1
Number a = 2
Number b = 2
Result = 4
MENU:
0 - exit
1 - addition
2 - subtraction
3 - multiplication
4 - division
Your choice : 3
Number a = 6
Number b = 6
Result = 36
MENU:
0 - exit
1 - addition
2 - subtraction
3 - multiplication
4 - division
Your choice : 0
[ec2-user@ip-172-31-82-95 Lab 2.5.4 (1)]$
```

Lab 2.9.8 (1)

```
[ec2-user@ip-172-31-82-95 Lab 2.9.8 (1)]$ g++ -lm -o output Lab*.cpp
[ec2-user@ip-172-31-82-95 Lab 2.9.8 (1)]$ ./output
0 4 7 2 8 1 3
[ec2-user@ip-172-31-82-95 Lab 2.9.8 (1)]$
```

Lab 2.9.8 (2)

```
[ec2-user@ip-172-31-82-95 Lab 2.9.8 (1)]$ g++ -lm -o output Lab*.cpp
[ec2-user@ip-172-31-82-95 Lab 2.9.8 (1)]$ ./output
0 4 7 2 8 1 3
[ec2-user@ip-172-31-82-95 Lab 2.9.8 (1)]$ mc

[ec2-user@ip-172-31-82-95 Lab 2.9.8 (2)]$ g++ -lm -o output Lab*.cpp
[ec2-user@ip-172-31-82-95 Lab 2.9.8 (2)]$ ./output
Cash = 125
50 50 20 5 [ec2-user@ip-172-31-82-95 Lab 2.9.8 (2)]$ ./output
Cash = 127
50 50 20 5 1 1 [ec2-user@ip-172-31-82-95 Lab 2.9.8 (2)]$ ./output
Cash = 49
20 20 5 1 1 1 1 [ec2-user@ip-172-31-82-95 Lab 2.9.8 (2)]$ ./output
Cash = 42
20 20 1 1 [ec2-user@ip-172-31-82-95 Lab 2.9.8 (2)]$
```

### Lab 2.9.8 (3)

```
[ec2-user@ip-172-31-82-95 Lab 2.9.8 (3)]$ g++ -lm -o output Lab*.cpp
[ec2-user@ip-172-31-82-95 Lab 2.9.8 (3)]$ ./output
It's a palindrome
[ec2-user@ip-172-31-82-95 Lab 2.9.8 (3)]$
```

### Lab 2.9.8 (4)

```
[ec2-user@ip-172-31-82-95 Lab 2.9.8 (4)]$ g++ -lm -o output Lab*.cpp
[ec2-user@ip-172-31-82-95 Lab 2.9.8 (4)]$ ./output
Arithmetic Mean = 3
Harmonic Mean = 2.18978
Geometric Mean = 2.60517
RootMean Square = 3.31662
[ec2-user@ip-172-31-82-95 Lab 2.9.8 (4)]$
```

### Lab 2.9.8 (5)

```
[ec2-user@ip-172-31-82-95 Lab 2.9.8 (5)]$ g++ -lm -o output Lab*.cpp
[ec2-user@ip-172-31-82-95 Lab 2.9.8 (5)]$ ./output
The matrix is symmetric
[ec2-user@ip-172-31-82-95 Lab 2.9.8 (5)]$
```

### Lab 2.11.6 (1)

```
[ec2-user@ip-172-31-82-95 Lab 2.11.6 (1)]$ g++ -lm -o output Lab*.cpp
[ec2-user@ip-172-31-82-95 Lab 2.11.6 (1)]$ ./output
Type hour: 11
Type minuts: 58
Duration: 23
Time: 12:21
[ec2-user@ip-172-31-82-95 Lab 2.11.6 (1)]$ ./output
Type hour: 23
Type minuts: 55
Duration: 1880
Time: 7:15
[ec2-user@ip-172-31-82-95 Lab 2.11.6 (1)]$ ./output
Type hour: 23
Type minuts: 55
Duration: 1441
Time: 23:56
[ec2-user@ip-172-31-82-95 Lab 2.11.6 (1)]$ ./output
Type hour: 7
Type minuts: 45
Duration: 510
Time: 16:15
[ec2-user@ip-172-31-82-95 Lab 2.11.6 (1)]$ ./output
Type hour: 21
Type minuts: 59
Duration: 600
Time: 7:59
[ec2-user@ip-172-31-82-95 Lab 2.11.6 (1)]$
```

## Lab 2.11.6 (2)

```
[ec2-user@ip-172-31-82-95 Lab 2.11.6 (2)]$ g++ -lm -o output Lab*.cpp
[ec2-user@ip-172-31-82-95 Lab 2.11.6 (2)]$ ./output
Start time:
Type hour: 0
Type minuts: 1
End time:
Type hour: 23
Type minuts: 59
Duration : 23:58
[ec2-user@ip-172-31-82-95 Lab 2.11.6 (2)]$ ./output
Start time:
Type hour: 12
Type minuts: 58
End time:
Type hour: 13
Type minuts: 3
Duration : 0:5
[ec2-user@ip-172-31-82-95 Lab 2.11.6 (2)]$ ./output
Start time:
Type hour: 8
Type minuts: 2
End time:
Type hour: 19
Type minuts: 43
Duration : 11:41
[ec2-user@ip-172-31-82-95 Lab 2.11.6 (2)]$ ./output
Start time:
Type hour: 8
Type minuts: 2
End time:
Type hour: 17
Type minuts: 43
Duration : 9:41
[ec2-user@ip-172-31-82-95 Lab 2.11.6 (2)]$
```