



Computer Systems and Programming

Manual 4 Lab Task

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Class: ME-15 C

Q1. Convert the following while loop to a do-while loop:

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

```
1  #include <iostream>
2  using namespace std;
3
4  int main() {
5      int x;
6      do { cout << "Enter a number: " << endl;
7          cin >> x;
8      } while (x > 0);
9      return 0;
10 }
11
```

Q2. Use a do while loop to make a simple calculator for two numbers. Insert buttons for it to ask again and for termination.

```
1  #include <iostream>
2  using namespace std;
3
4  int main() {
5      char yn;
6      do {
7          float x,y,ans;
8          char op;
9          cout << "Enter your first number" << endl;
10         cin >> x;
11         cout << "Choose an operation (+, -, *, /)" << endl;
12         cin >> op;
13         cout << "Enter the second number: ";
14         cin >> y;
15         switch (op) {
16             case '+':
17                 ans = x+y;
18                 break;
19             case '-':
20                 ans = x-y;
21                 break;
22             case '*':
23                 ans = x*y;
24                 break;
25             case '/':
26                 ans = x/y;
27                 break;
28             default:
29                 cout << "Invalid operation" << endl;
30         }
31         cout << "Answer: " << ans << endl;
32         cout << "Do you want to perform another calculation? Reply with 'y' or 'n'" << endl;
33         cin >> yn;
34     }
35     while (yn == 'y');
36     cout << "Program terminated" << endl;
37     return 0;
38 }
39
```

```
Enter your first number
2
Choose an operation (+, -, *, /)
+
Enter your second number
4
Answer: 6
Do you want to perform another calculation? Reply with 'y' or 'n'
y
Enter your first number
5
Choose an operation (+, -, *, /)
*
Enter your second number
4
Answer: 20
Do you want to perform another calculation? Reply with 'y' or 'n'
n
Program terminated

Process returned 0 (0x0)   execution time : 19.134 s
Press any key to continue.
```

Q3. 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).

```
1  #include <iostream>
2  using namespace std;
3
4  int main() {
5      int x=2;
6      int sum1=0;
7      int y=1;
8      int sum2=0;
9      while (x<=100) {
10         sum1 += x;
11         x+=2;
12     }
13     cout << "The sum of all even numbers between 2 and 100 is " << sum1 << endl;
14     while (y<=100) {
15         sum2 += y*y;
16         y++;
17     }
18     cout << "The sum of all squares between 1 and 100 is " << sum2 << endl;
19     return 0;
20 }
21
```

```
The sum of all even numbers between 2 and 100 is 2550
The sum of all squares between 1 and 100 is 338350
```

```
Process returned 0 (0x0)    execution time : 0.030 s
Press any key to continue.
```

Q4. Write programs with while or do while loops that compute:

a. All powers of 2 from 20 up to 220.

b. The sum of all odd numbers between a and b (inclusive), where a and b are inputs.

a)

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

```
2^0=1
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
```

```
Process returned 0 (0x0)   execution time : 0.035 s
Press any key to continue.
```

b)

```
1  #include <iostream>
2  using namespace std;
3
4  int main() {
5      int a,b;
6      int sum = 0;
7
8      cout << "Enter the odd value of a 'starting number'" << endl;
9      cin >> a;
10     cout << "Enter the odd value of b 'ending number'" << endl;
11     cin >> b;
12     int c=a;
13     while (c <= b) {
14         if (c %2 != 0) {
15             sum +=c;
16         }
17         c++;
18     }
19     cout << "The sum of all odd numbers between " << a << " and " << b << " is " << sum << endl;
20
21     return 0;
22 }
23
```

```
Enter the odd value of a 'starting number'
3
Enter the odd value of b 'ending number'
19
The sum of all odd numbers between 3 and 19 is 99

Process returned 0 (0x0)    execution time : 2.168 s
Press any key to continue.
```