

Lab Assignment

Name	S Vishwajith
Registration Number	23BCE1145
Subject	Compiler Design
Assignment Number	2

Question 1:

Write a regex to check if a string contains only alphabets.

Code:

```
// A C++ program to write a regex to check if a string contains only alphabets.
```

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

```
int main()
{
    string str;
    cout << "Enter a string: ";
    cin >> str;

    regex pattern("^[A-Za-z]+$");

    if (regex_match(str, pattern))
    {
        cout << "The string contains only alphabets." << endl;
    }
    else
    {
```

```

cout << "The string contains characters other than alphabets." << endl;
}

return 0;
}

```

Output:

```

PS C:\Users\vishw\Coding\Compiler-Lab> cd "c:\Users\vishw\Coding\Compiler-Lab\Week-2\" ; if ($?) { g++ Q1.cpp -o Q1 } ; if ($?) { .\Q1 }
Enter a string: abcdefg
The string contains only alphabets.
PS C:\Users\vishw\Coding\Compiler-Lab\Week-2> cd "c:\Users\vishw\Coding\Compiler-Lab\Week-2\" ; if ($?) { g++ Q1.cpp -o Q1 } ; if ($?) { .\Q1 }
Enter a string: abc1
The string contains characters other than alphabets.
PS C:\Users\vishw\Coding\Compiler-Lab\Week-2> █

```

Question 2:

Write a regex to validate a 10-digit Indian mobile number starting with digits 6 to 9.

Code:

```
// A C++ code to write a regex to validate a 10-digit Indian mobile number starting with
digits 6 to 9.
```

```

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

int main()
{
    string mobileNo;
    cout << "Enter a 10-digit Indian mobile number: ";
    cin >> mobileNo;
    regex pattern("^[6-9][0-9]{9}$");
    if (regex_match(mobileNo, pattern))
    {
        cout << "The mobile number is valid." << endl;
    }
}

```

```

    }

else
{
    cout << "The mobile number is invalid." << endl;
}

}

```

Output:

```

PS C:\Users\vishw\Coding\Compiler-Lab> cd "c:\Users\vishw\Coding\Compiler-Lab\Week-2\" ; if ($?) { g++ Q2.cpp -o Q2 } ; if ($?) { .\Q2 }
Enter a 10-digit Indian mobile number: 1234567890
The mobile number is invalid.
PS C:\Users\vishw\Coding\Compiler-Lab\Week-2> cd "c:\Users\vishw\Coding\Compiler-Lab\Week-2\" ; if ($?) { g++ Q2.cpp -o Q2 } ; if ($?) { .\Q2 }
Enter a 10-digit Indian mobile number: 6769686667
The mobile number is valid.
PS C:\Users\vishw\Coding\Compiler-Lab\Week-2>

```

Question 3:

Write a regex to validate an email address.

Code:

```
// A C++ program to write a regex to validate an email address.
```

```
#include <iostream>

#include <regex>

using namespace std;
```

```
int main()
{
    string emailAddredds;
    cout << "Enter an email address: ";
    cin >> emailAddredds;

    regex ep("^( [a-zA-Z]+)([a-zA-Z0-9_.-]* )@([a-zA-Z0-9.-]+)\\.( [a-zA-Z]{2,5})$");
    if (regex_match(emailAddredds, ep))
```

```

{
    cout << "This is a valid email address." << endl;
}

else
{
    cout << "This is an invalid email address." << endl;
}

return 0;
}

```

Output:

```

PS C:\Users\vishw\Coding\Compiler-Lab> cd "c:\Users\vishw\Coding\Compiler-Lab\Week-2" ; if ($?) { g++ Q3.cpp -o Q3 } ; if ($?) { .\Q3 }
● Enter an email address: something.something@something.something
This is an invalid email address.
● PS C:\Users\vishw\Coding\Compiler-Lab\Week-2> cd "c:\Users\vishw\Coding\Compiler-Lab\Week-2" ; if ($?) { g++ Q3.cpp -o Q3 } ; if ($?) { .\Q3 }
Enter an email address: vishwajith.s2023@gmail.com
This is a valid email address.
○ PS C:\Users\vishw\Coding\Compiler-Lab\Week-2>

```

Question 4:

Write a regex to validate dates in DD-MM-YYYY format.

Code:

```
// A C++ program to write a regex to validate dates in DD-MM-YYYY format.
```

```
#include <iostream>

#include <regex>

using namespace std;
```

```
int main()
{
    string date;

    cout << "Enter a date in the format \"DD-MM-YYYY\": ";

    cin >> date;
```

```

regex dp("^[0-3][0-9]\\-[0-1][0-9]\\-[0-9]{4}$");

if (regex_match(date, dp))
{
    cout << "The given date matches the given format." << endl;
}
else
{
    cout << "The given date doesn't match the given format." << endl;
}
return 0;
}

```

Output:

```

PS C:\Users\vishw\Coding\Compiler-Lab> cd "c:\Users\vishw\Coding\Compiler-Lab\Week-2\" ; if ($?) { g++ Q4.cpp -o Q4 } ; if ($?) { .\Q4 }
Enter a date in the format "DD-MM-YYYY": 11-09-2001
The given date matches the given format.
PS C:\Users\vishw\Coding\Compiler-Lab\Week-2> cd "c:\Users\vishw\Coding\Compiler-Lab\Week-2\" ; if ($?) { g++ Q4.cpp -o Q4 } ; if ($?) { .\Q4 }
Enter a date in the format "DD-MM-YYYY": 11-Sep-2001
The given date doesn't match the given format.
PS C:\Users\vishw\Coding\Compiler-Lab\Week-2> 

```

Question 5:

Write a C++ program to check whether the string is accepted or not – the string must contain exactly two occurrences of ‘a’.

Code:

```
// A C++ program to check whether the string is accepted or not – the string must
contain exactly two occurrences of 'a'.
```

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

```
int main()
```

```
{
```

```

string s;

cout << "Enter a string: ";

cin >> s;

regex sp("^[a]{2}$");

if (regex_match(s, sp))
{
    cout << "The string has exactly 2 occurrences of a." << endl;
}

else
{
    cout << "The string doesn't have exactly 2 occurrences of a." << endl;
}

return 0;
}

```

Output:

```

PS C:\Users\vishw\Coding\Compiler-Lab> cd "c:\Users\vishw\Coding\Compiler-Lab\Week-2\" ; if ($?) { g++ Q5.cpp -o Q5 } ; if ($?) { .\Q5 }
Enter a string: aa
The string has exactly 2 occurrences of a.
PS C:\Users\vishw\Coding\Compiler-Lab\Week-2> cd "c:\Users\vishw\Coding\Compiler-Lab\Week-2\" ; if ($?) { g++ Q5.cpp -o Q5 } ; if ($?) { .\Q5 }
Enter a string: ab
The string doesn't have exactly 2 occurrences of a.
PS C:\Users\vishw\Coding\Compiler-Lab\Week-2> cd "c:\Users\vishw\Coding\Compiler-Lab\Week-2\" ; if ($?) { g++ Q5.cpp -o Q5 } ; if ($?) { .\Q5 }
Enter a string: aaa
The string doesn't have exactly 2 occurrences of a.
PS C:\Users\vishw\Coding\Compiler-Lab\Week-2>

```

Question 6:

Write a C++ program to check whether the string is accepted or not – the string should be of even length and contain only a and b.

Code:

```
// A C++ program to check whether the string is accepted or not – the string should be of even length and contain only a and b.
```

```
#include <iostream>
```

```
#include <regex>
```

```

using namespace std;

int main()
{
    string s;
    cout << "Enter a string: ";
    cin >> s;

    regex sp("^[a|b]+$");

    if (regex_match(s, sp) && s.size() % 2 == 0)
    {
        cout << "The string is of even length and contains only a and b." << endl;
    }
    else
    {
        cout << "The string doesn't satisfy one or more of the given conditions." << endl;
    }
    return 0;
}

```

Output:

```

PS C:\Users\vishw\Coding\Compiler-Lab> cd "c:\Users\vishw\Coding\Compiler-Lab\Week-2" ; if ($?) { g++ Q6.cpp -o Q6 } ; if ($?) { .\Q6 }
● Enter a string: aabbabab
The string is of even length and contains only a and b.
PS C:\Users\vishw\Coding\Compiler-Lab\Week-2> cd "c:\Users\vishw\Coding\Compiler-Lab\Week-2" ; if ($?) { g++ Q6.cpp -o Q6 } ; if ($?) { .\Q6 }
Enter a string: aab
The string doesn't satisfy one or more of the given conditions.
PS C:\Users\vishw\Coding\Compiler-Lab\Week-2> cd "c:\Users\vishw\Coding\Compiler-Lab\Week-2" ; if ($?) { g++ Q6.cpp -o Q6 } ; if ($?) { .\Q6 }
Enter a string: bacd
The string doesn't satisfy one or more of the given conditions.
PS C:\Users\vishw\Coding\Compiler-Lab\Week-2> █

```

Question 7:

Write a C++ program to check whether the string is accepted or not – the string should begin and end with the same character.

Code:

```
// A C++ program to check whether the string is accepted or not – the string should
// begin and end with the same character.

#include <iostream>

using namespace std;

int main()
{
    string s;
    cout << "Enter a string: ";
    cin >> s;
    if (s[0] == s[s.size() - 1])
    {
        cout << "The first and last characters are the same." << endl;
    }
    else
    {
        cout << "The first and last characters are not the same." << endl;
    }
    return 0;
}
```

Output:

```
PS C:\Users\vishw\Coding\Compiler-Lab> cd "c:\Users\vishw\Coding\Compiler-Lab\Week-2\" ; if ($?) { g++ Q7.cpp -o Q7 } ; if ($?) { .\Q7 }
Enter a string: river
The first and last characters are the same.
PS C:\Users\vishw\Coding\Compiler-Lab\Week-2> cd "c:\Users\vishw\Coding\Compiler-Lab\Week-2\" ; if ($?) { g++ Q7.cpp -o Q7 } ; if ($?) { .\Q7 }
Enter a string: tamil
The first and last characters are not the same.
PS C:\Users\vishw\Coding\Compiler-Lab\Week-2>
```

Question 8:

Write a C++ program to check whether the string is accepted or not – the string must end with “abb”.

Code:

```
// A C++ program to check whether the string is accepted or not – the string must end
// with “abb”.
#include <iostream>
using namespace std;

int main()
{
    string s;
    cout << "Enter a string: ";
    cin >> s;
    if (s.size() >= 3 && s.substr(s.size() - 3) == "abb")
    {
        cout << "The string ends with \"abb\"." << endl;
    }
    else
    {
        cout << "The string does not end with \"abb\"." << endl;
    }
    return 0;
}
```

Output:

```
PS C:\Users\vishw\Coding\Compiler-Lab> cd "c:\Users\vishw\Coding\Compiler-Lab\Week-2" ; if ($?) { g++ Q8.cpp -o Q8 } ; if ($?) { .\Q8 }
Enter a string: sabb
The string ends with "abb".
PS C:\Users\vishw\Coding\Compiler-Lab\Week-2> cd "c:\Users\vishw\Coding\Compiler-Lab\Week-2" ; if ($?) { g++ Q8.cpp -o Q8 } ; if ($?) { .\Q8 }
Enter a string: abb
The string ends with "abb".
PS C:\Users\vishw\Coding\Compiler-Lab\Week-2> cd "c:\Users\vishw\Coding\Compiler-Lab\Week-2" ; if ($?) { g++ Q8.cpp -o Q8 } ; if ($?) { .\Q8 }
Enter a string: rapper
The string does not end with "abb".
```

Question 9:

Write a C++ program to check whether the string is accepted or not – the string must contain no consecutive repeating characters.

Code:

```
// A C++ program to check whether the string is accepted or not – the string must contain no consecutive repeating characters.
```

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

int main()
{
    string s;
    cout << "Enter a string: ";
    cin >> s;
    bool flag = true;
    for (int i = 0; i < s.size() - 1; i++)
    {
        if (s[i] == s[i + 1])
        {
            flag = false;
            break;
        }
    }
    if (flag)
    {
        cout << "There are no consecutive repeating characters." << endl;
    }
    else
```

```

{
    cout << "There are consecutive repeating characters." << endl;
}

return 0;
}

```

Output:

```

PS C:\Users\vishw\Coding\Compiler-Lab> cd "c:\Users\vishw\Coding\Compiler-Lab\Week-2\" ; if ($?) { g++ 09.cpp -o 09 } ; if ($?) { .\09 }
Enter a string: abab
There are no consecutive repeating characters.
PS C:\Users\vishw\Coding\Compiler-Lab\Week-2> cd "c:\Users\vishw\Coding\Compiler-Lab\Week-2\" ; if ($?) { g++ 09.cpp -o 09 } ; if ($?) { .\09 }
Enter a string: aabb
There are consecutive repeating characters.
PS C:\Users\vishw\Coding\Compiler-Lab\Week-2>

```

Question 10:

Write a C++ program to check whether the string is accepted or not – the string must contain both substrings “ab” and “ba” at least once, in any order.

Code:

```

// a C++ program to check whether the string is accepted or not – the string must
// contain both substrings “ab” and “ba” at least once, in any order.

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

int main()
{
    string s;
    cout << "Enter a string: ";
    cin >> s;

    regex sp1("ab"), sp2("ba");

    if (regex_search(s, sp1) && regex_search(s, sp2))

```

```

{
    cout << "The string contains both \"ab\" and \"ba\"." << endl;
}
else
{
    cout << "The string doesn't contain either \"ab\" or \"ba\"." << endl;
}
return 0;
}

```

Output:

```

PS C:\Users\vishw\Coding\Compiler-Lab> cd "c:\Users\vishw\Coding\Compiler-Lab\Week-2\" ; if ($?) { g++ Q10.cpp -o Q10 } ; if ($?) { .\Q10 }
Enter a string: 1ab2
The string doesn't contain either "ab" or "ba".
PS C:\Users\vishw\Coding\Compiler-Lab\Week-2> cd "c:\Users\vishw\Coding\Compiler-Lab\Week-2\" ; if ($?) { g++ Q10.cpp -o Q10 } ; if ($?) { .\Q10 }
Enter a string: aba
The string contains both "ab" and "ba".
PS C:\Users\vishw\Coding\Compiler-Lab\Week-2>

```

Question 11:

Write a C++ program to check whether the string is accepted or not – the string length must be a prime number, and the string must contain only 0s and 1s.

Code:

```
// A C++ program to check whether the string is accepted or not – the string length must
be a prime number, and the string must contain only 0s and 1s.
```

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

```
bool isPrime(int n)
```

```
{
    if (n <= 1)
    {

```

```

        return false;
    }

    for (int i = 2; i <= sqrt(n); i++)
    {
        if (n % i == 0)
        {
            return false;
        }
    }

    return true;
}

int main()
{
    string s;

    cout << "Enter a string: ";
    cin >> s;

    regex sp("^[0|1]+$");

    if (regex_match(s, sp) && isPrime(s.size()))
    {
        cout << "The string is of prime number length and contains only 0 and 1." << endl;
    }
    else
    {
        cout << "The string doesn't satisfy one or more of the given conditions." << endl;
    }
}

return 0;

```

```
}
```

Output:

```
PS C:\Users\vishw\Coding\Compiler-Lab> cd "c:\Users\vishw\Coding\Compiler-Lab\Week-2\" ; if ($?) { g++ Q11.cpp -o Q11 } ; if ($?) { .\Q11 }
Enter a string: 01001
The string is of prime number length and contains only 0 and 1.
PS C:\Users\vishw\Coding\Compiler-Lab\Week-2> cd "c:\Users\vishw\Coding\Compiler-Lab\Week-2\" ; if ($?) { g++ Q11.cpp -o Q11 } ; if ($?) { .\Q11 }
Enter a string: 01aab
The string doesn't satisfy one or more of the given conditions.
PS C:\Users\vishw\Coding\Compiler-Lab\Week-2> cd "c:\Users\vishw\Coding\Compiler-Lab\Week-2\" ; if ($?) { g++ Q11.cpp -o Q11 } ; if ($?) { .\Q11 }
Enter a string: 0101
The string doesn't satisfy one or more of the given conditions.
PS C:\Users\vishw\Coding\Compiler-Lab\Week-2>
```