FOCP 2 ASSIGNMENT 1

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ROLL NUMBER:24CSU036

QUES 1: **CODE**

Settings | 2darray.cpp | function.cpp | focp2ass1.cpp | intro.cpp | practise.cpp

c++ > focp2ass1.cpp > main()

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

bool isPrime(int n) {
    if (n <= 1) return false;
    for (int i = 2; i * i <= n; i++) {
        if (n % i == 0) return false;
    }
    return true;
}

int main() {
    int n;
    cout << "Enter a positive integer: ";
    cin >> n;

    if (n <= 0) {
        cout << "Please enter a positive integer." << endl;
        return 1;
    }

    if (isPrime(n)) {
        cout << n << " is a prime number." << endl;
        for (int next = n + 1;; next++) {
            if (isPrime(next)) {
                cout << "The next prime number greater than " << n << " is " << next << "." << endl;
                break;
            }
        }
    } else {
        cout << n << " is not a prime number." << endl;
        cout << "Factors of " << n << " are: ";
        for (int i = 1; i <= n; i++) {
            if (n % i == 0) cout << i << " ";
        }
        cout << endl;
    }

    return 0;
}
```

Rectangular Snip

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

```
The next prime number greater than 3 is 5.
PS C:\Users\Mr\Desktop\bhavi\c++> cd "c:\Users\Mr\Desktop\bhavi\c++\" ; if ($?) { g++ focp2ass1.cpp -o focp2ass1 } ; if ($?) { .\focp2ass1 }
Enter a positive integer: 3
3 is a prime number.
The next prime number greater than 3 is 5.
PS C:\Users\Mr\Desktop\bhavi\c++>
```

QUES 2;

CODE:

```
nclude <iostream>
nclude <algorithm>
ing namespace std;

t main() {
  int n;

  // a. Accept array size and elements
  cout << "Enter the size of the array: ";
  cin >> n;

  if (n < 2) {
      cout << "MAKE ARRAY" << endl;
      return 1;
  }

  int arr[n];
  cout << "Enter " << n << " elements: ";
  for (int i = 0; i < n; i++) {
      cin >> arr[i];
  }

  // b. Reverse the array
  cout << "Reversed array: ";
  for (int i = n - 1; i >= 0; i--) {
      cout << arr[i] << " ";
  }
  cout << endl;

  // c. Find second largest and second smallest
  sort(arr, arr + n);

  int secondSmallest = arr[1];
  int secondLargest = arr[n - 2];

  cout << "Second smallest element: " << secondSmallest << endl;
  cout << "Second largest element: " << secondLargest << endl;

  return 0;
```

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS

Windows PowerShell
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PS C:\Users\Mr\Desktop\bhavi> cd "c:\Users\Mr\Desktop\bhavi\c++\" ; if ($?) { g++ focp2ass1.cpp -o focp2ass1 } ; if ($?) { .\focp2ass1 }
Enter the size of the array: 5
Enter 5 elements: 12 13 14 15 16
Reversed array: 16 15 14 13 12
Second smallest element: 13
Second largest element: 15
PS C:\Users\Mr\Desktop\bhavi\c++>
```

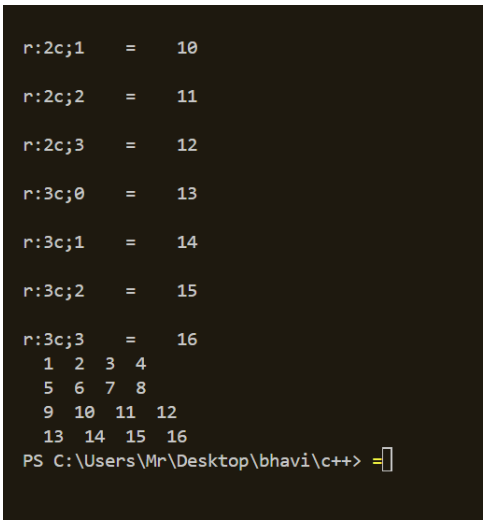
QUES4;

CODE:

c++ > 2darray.cpp > main()

```cpp
#include<iostream>
using namespace std;
//create  MATRIX BY ROW COLUMN ARRAY METHOD
int main(){
    int rcount,ccount;
    cout<<endl<<"enter the value of rows and column";
    cin>>rcount>>ccount;
    int arr[rcount][ccount];
    int r,c;
    for(r=0;r<rcount;r++){
        for(c=0;c<ccount;c++){
            cout<<endl<<"r:"<<r<<"c;"<<c<<"    =    ";
            cin>>arr[r][c];

        }
    }
    for(r=0;r<rcount;r++){
        for(c=0;c<ccount;c++){
            cout<<"  "<<arr[r][c];
        }
        cout<<endl;
    }
    return 0;
```


r:2c;1 = 10
r:2c;2 = 11
r:2c;3 = 12
r:3c;0 = 13
r:3c;1 = 14
r:3c;2 = 15
r:3c;3 = 16
1 2 3 4
5 6 7 8
9 10 11 12
13 14 15 16
PS C:\Users\Mr\Desktop\bhavi\c++>

QUES 5.

CODE:

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

#define N 3 // Matrix size

void rotate90Clockwise(int matrix[N][N]) {
    for (int i = 0; i < N; i++) {
        for (int j = i; j < N; j++) {
            swap(matrix[i][j], matrix[j][i]); // Transpose
        }
    }

    for (int i = 0; i < N; i++) {
        for (int j = 0, k = N - 1; j < k; j++, k--) {
            swap(matrix[i][j], matrix[i][k]); // Reverse each row
        }
    }
}

void printMatrix(int matrix[N][N]) {
    for (int i = 0; i < N; i++) {
        for (int j = 0; j < N; j++) {
            cout << matrix[i][j] << " ";
        }
        cout << endl;
    }
}

int main() {
    int matrix[N][N] = {
        {1, 2, 3},
        {4, 5, 6},
        {7, 8, 9}
    };

    cout << "Original Matrix:\n";
    printMatrix(matrix);

    rotate90Clockwise(matrix);

    cout << "\nRotated Matrix:\n";
    printMatrix(matrix);
```

```
    printMatrix(matrix);

    return 0;
}
```

```
PS C:\Users\Mr\Desktop\bhavi\c++> cd "c:\Users\Mr\Desktop\bhavi\c++\" ; if ($?) { g++ focp2ass1.cpp -o focp2ass1 } ; if ($?) { .\focp2ass1 }
Original Matrix:
1 2 3
4 5 6
7 8 9

Rotated Matrix:
7 4 1
8 5 2
9 6 3
PS C:\Users\Mr\Desktop\bhavi\c++>
```

QUES 3:

CODE:

```cpp
#include <iostream>
#include <cctype> // string functions (like tolower , isalpha)
using namespace std;

int main() {
    string str;
    cout << "Enter a string: ";
    getline(cin, str);

    // Palindrome Check (ignoring spaces and case)
    int left = 0, right = str.length() - 1;
    bool isPalin = true;
    while (left < right) {
        if (tolower(str[left]) != tolower(str[right]))
        {
            isPalin = false;
            break;
        }
        left++;
        right--;
    }
    if (isPalin) {
        cout << "The string is a palindrome." << endl;
    } else {
        cout << "The string is not a palindrome." << endl;
    }

    // Count Character Frequency (assuming - case insensitive)
    int frequency[26] = {0};  // Array for counting letters from a to z
    for (int i = 0; i < str.length(); i++) {
        if (isalpha(str[i])) {
            char ch = tolower(str[i]);
            frequency[ch - 'a']++;  // Increment frequency of the character
        }
    }
    cout << "Character frequencies (case-insensitive):" << endl;
    for (int i = 0; i < 26; i++) {
        if (frequency[i] > 0) {
            cout << char(i + 'a') << ": " << frequency[i] << endl;
        }
    }
    // Replace Vowels with '*'
    for (int i = 0; i < str.length(); i++) {
        char ch = tolower(str[i]);
        if (ch == 'a' || ch == 'e' || ch == 'i' || ch == 'o' || ch == 'u') {
            str[i] = '*';  // Replace vowel with '*'
        }
    }
    cout << "Modified string : " << str << endl;
    return 0;
}
```

AFTER RUNNING:

```
PS C:\Users\Mr\Desktop\bhavi> cd "c:\Users\Mr\Desktop\bhavi\c++\" ; if ($?) { g++ focp2ass1.cpp -o focp2ass1 } ; if ($?) { .\focp2ass1 }
Enter a string: cd "c:\Users\Mr\Desktop\bhavi\c++\" ; if ($?) { g++ focp2ass1.cpp -o focp2ass1 } ; if ($?) { .\focp2ass1 }
Not a palindrome
Character frequency:
1: 3
2: 3
a: 4
b: 1
c: 7
d: 2
e: 2
f: 5
g: 1
h: 1
i: 3
k: 1
m: 1
o: 5
p: 6
r: 2
s: 9
t: 1
u: 1
v: 1
Modified: cd "c:\*s*rs\Mr\D*skt*p\bh*v*\c++\" ; *f ($?) { g++ f*cp2*ss1.cpp -* f*cp2*ss1 } ; *f ($?) { .\f*cp2*ss1 }
PS C:\Users\Mr\Desktop\bhavi\c++> cd "c:\Users\Mr\Desktop\bhavi\c++\" ; if ($?) { g++ focp2ass1.cpp -o focp2ass1 } ; if ($?) { .\focp2ass1 }
Enter a string: AFTER
The string is not a palindrome.
Character frequencies (case-insensitive):
a: 1
e: 1
f: 1
r: 1
t: 1
Modified string : *FT*R
PS C:\Users\Mr\Desktop\bhavi\c++>
```