Q1

```
#include <iostream>
#include <limits.h>

bool isprime(int x) {
   if (x < 2) {
      return true;
   }
   for (int i = 2; i <= x / 2; i++) {
      if (x % i == 0) {
         return false;
      }
   }
   return true;
}

int main() {
   int x;
   std::cout << "enter the value of x: ";
   std::cin >> x;
   if (isprime(x)) {
      std::cout << "the number is prime" << std::endl;
   }

   else {
      std::cout << "the factors are: ";
      for (int i = 1; i <= x / 2; i++) {
         if (x % i == 0) {
```

```
            std::cout << i << " ";
        }
      }
    }


    if(isprime(x)) {
      std::cout << "the nearest prime number after " << x << " is ";
      while(x < INT_MAX) {
        x++;
        if(isprime(x)) {
          std::cout << x;
          break;
        }
      }
    }

}
```

Q2

```
#include <iostream>

int main() {
   int max;
   std::cout << "enter the size of array: ";
   std::cin >> max;
   int arr[max], temp;
```

```
  std::cout << "enter the elements of array: ";
  for(int i = 0; i < max; i++) {
     std::cin >> arr[i];
  }

  for(int i = 0; i < max / 2; i++) {
     temp = arr[i];
     arr[i] = arr[max - i - 1];
     arr[max - i - 1] = temp;
  }
  std::cout << "the reversed array is: ";
  for(int i = 0; i < max; i++) {
     std::cout << arr[i] << " ";
  }

  for(int i = 0; i < max; i++) {
     for(int j = 0; j < max; j++){
        if(arr[j] > arr[j + 1]) {
           temp = arr[j];
           arr[j] = arr[j + 1];
           arr[j + 1] = temp;
        }
     }
  }

  std::cout << std::endl << "the second smallest element is: " << arr[1] << std::endl <<
"the second largest element is: " << arr[max - 2];
```

```
}
```

Q3

```
#include <iostream>
#include <string>

using namespace std;

bool isPalindrome(string str) {
  int left = 0, right = str.length() - 1;

  while (left < right) {
    // Skip spaces on the left and right
    if (str[left] == ' ') {
      left++;
      continue;
    }
    if (str[right] == ' ') {
      right--;
      continue;
    }

    // Compare characters while ignoring case sensitivity
    if (str[left] != str[right] && (str[left] + 32 != str[right] && str[left] - 32 != str[right])) {
      return false;
    }

    left++;
```

```
        right--;
    }

    return true;
}

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

    if (isPalindrome(userInput)) {
        cout << "The string is a palindrome." << endl;
    } else {
        cout << "The string is not a palindrome." << endl;
    }

    return 0;
}
```

Q4

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

int main() {
    int size;
    cout << "Enter the size of matrix: ";
    cin >> size;
```

```
int matrix[50][50];
cout << "Enter the elements of matrix: ";
for (int row = 0; row < size; row++) {
   for (int col = 0; col < size; col++) {
      cin >> matrix[row][col];
   }
}

int top = 0, bottom = size - 1, left = 0, right = size - 1;

while (top <= bottom && left <= right) {
   // Print top row
   for (int col = left; col <= right; col++) {
      cout << matrix[top][col] << " ";
   }
   top++;

   // Print right column
   for (int row = top; row <= bottom; row++) {
      cout << matrix[row][right] << " ";
   }
   right--;

   // Print bottom row
   if (top <= bottom) {
      for (int col = right; col >= left; col--) {
         cout << matrix[bottom][col] << " ";
```

```
        }
        bottom--;
    }

    // Print left column
    if (left <= right) {
        for (int row = bottom; row >= top; row--) {
            cout << matrix[row][left] << " ";
        }
        left++;
    }
  }

  return 0;
}
```