Day-3

DOMAIN WINTER WINNING CAMP

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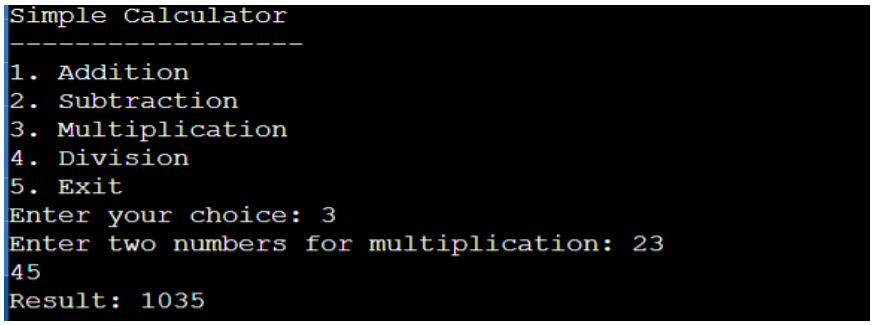
Section : 620 -B

1. Simple Calculator in C++ for Addition, Subtraction, Multiplication:

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

void calculator() {
    char operation;
    float num1, num2;

    cout << "Enter operator (+, -, *): ";
    cin >> operation;

    cout << "Enter two operands: ";
    cin >> num1 >> num2;

    switch (operation) {
        case '+':
            cout << num1 << " + " << num2 << " = " << num1 + num2;
            break;
        case '-':
            cout << num1 << " - " << num2 << " = " << num1 - num2;
            break;
        case '*':
```

```
            cout << num1 << " * " << num2 << " = " << num1 * num2;
            break;
        default:
            cout << "Error! Operator is not correct.";
            break;
    }
}
int main() {
    calculator();
    return 0;
}
```

Output:

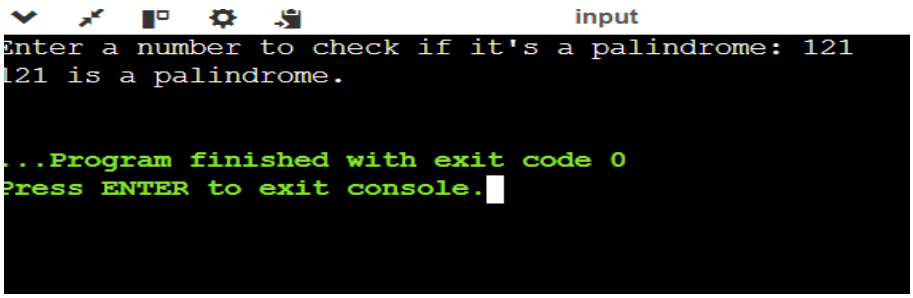


2. **C++ Program to Check Palindrome Using Function:**

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

bool isPalindrome(int num) {
    int original = num, reversed = 0, remainder;
    while (num != 0) {
        remainder = num % 10;
        reversed = reversed * 10 + remainder;
        num /= 10;
    }
    return original == reversed;
```

```
}

int main() {
    int number;
    cout << "Enter a number: ";
    cin >> number;
    if (isPalindrome(number))
        cout << number << " is a palindrome.";
    else
        cout << number << " is not a palindrome.";
    return 0;
}
```

Output:

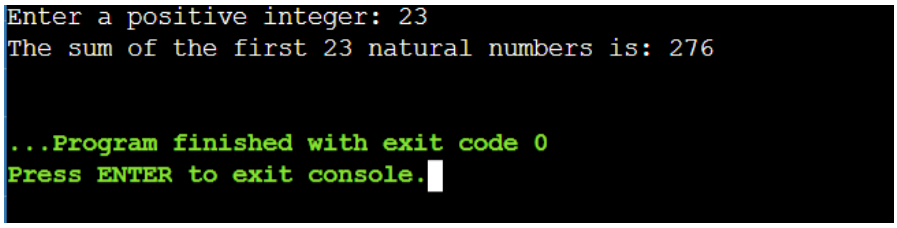


3. **Sum of Natural Numbers Using Recursion in C++:**

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

int sumOfNaturalNumbers(int n) {
    if (n <= 1)
        return n;
    return n + sumOfNaturalNumbers(n - 1);
}
int main() {
```

```
    int number;
    cout << "Enter a positive integer: ";
    cin >> number;
    cout << "Sum of natural numbers up to " << number << " is " <<
sumOfNaturalNumbers(number);
    return 0;
}
```

Output :

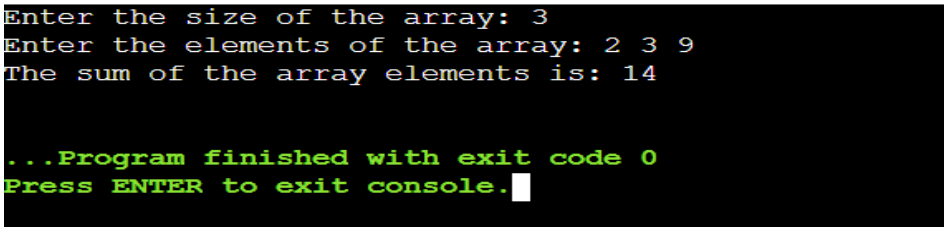


4. **Sum of Array Elements Using Recursion in C++:**

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

int sumArray(int arr[], int size) {
    if (size <= 0)
        return 0;
    return arr[size - 1] + sumArray(arr, size - 1);
}
int main() {
    int n;
    cout << "Enter the number of elements in array: ";
    cin >> n;
    int arr[n];
    cout << "Enter the elements of the array: ";
```

```
    for (int i = 0; i < n; i++)
        cin >> arr[i];
    cout << "Sum of array elements: " << sumArray(arr, n);
    return 0;
}
```

Output:

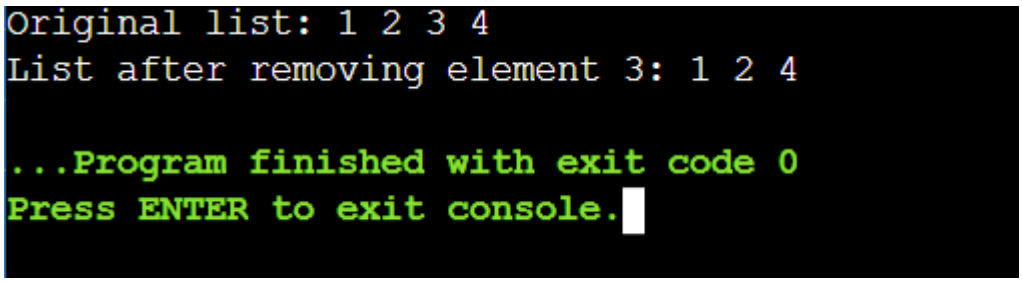


5. **Remove Linked List Element in C++:**

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

struct Node {
    int data;
    Node* next;
    Node(int x) : data(x), next(NULL) {}
};

Node* removeElement(Node* head, int val) {
    Node* dummy = new Node(0);
    dummy->next = head;
    Node* prev = dummy;
    while (head != NULL) {
        if (head->data == val) {
            prev->next = head->next;
        } else {
```

```
            prev = head;
        }
        head = head->next;
    }
    return dummy->next;
}

void printList(Node* node) {
    while (node != NULL) {
        cout << node->data << " ";
        node = node->next;
    }
}

int main() {
    Node* head = new Node(1);
    head->next = new Node(2);
    head->next->next = new Node(3);
    head->next->next->next = new Node(4);

    cout << "Original list: ";
    printList(head);

    int valueToRemove = 3;
    head = removeElement(head, valueToRemove);

    cout << "\nList after removing element " << valueToRemove << ": ";
    printList(head);

    return 0;
}
```

Output:



6. **Find the Winner of Circular Game in C++:**

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

int findWinner(int n, int k) {
    vector<int> circle;
    for (int i = 1; i <= n; i++)
        circle.push_back(i);

    int index = 0;
    while (circle.size() > 1) {
        index = (index + k - 1) % circle.size();
        circle.erase(circle.begin() + index);
    }
    return circle[0];
}

int main() {
    int n = 5, k = 3;
    cout << "The winner of the circular game is: " << findWinner(n, k);
    return 0;
}
```

```
Enter the number of participants (n): 2
Enter the step size (k): 4
The winner is at position: 1


...Program finished with exit code 0
Press ENTER to exit console.
```

Ques 1. Sum of two numbers using function.

```
#include <iostream>
using namespace std;
int sumof(int x, int y)
{
return (x + y);
}
int main() {
int a, b, sum = 0;
cout << "Enter the first number: ";
cin >> a;
cout << "Enter the second number: ";
cin >> b;
sum = sumof(a, b);
cout << "Sum of " << a << " and " << b << " is: " << sum << endl;
return 0;
}
```

```
Enter the first number: 2
Enter the second number: 3
Sum of 2 and 3 is: 5


...Program finished with exit code
Press ENTER to exit console.
```

Ques 2. array sum

```
#include <iostream>
#include <vector>
using namespace std;
vector<int> sumArrays(const vector<int>& a1, const vector<int>& a2) {
vector<int> result;
int size = min(a1.size(), a2.size()); // Ensure the arrays align by size
for (int i = 0; i < size; i++) {
result.push_back(a1[i] + a2[i]);
}
return result;
}
int main() {
int n1, n2;
cout << "Enter the number of elements for the first array (a1): ";
cin >> n1;
vector<int> a1(n1);
cout << "Enter the elements of the first array (a1): ";
for (int i = 0; i < n1; i++) {
cin >> a1[i];
}
cout << "Enter the number of elements for the second array (a2): ";
cin >> n2;
vector<int> a2(n2);
cout << "Enter the elements of the second array (a2): ";
for (int i = 0; i < n2; i++) {
cin >> a2[i];
}
vector<int> result = sumArrays(a1, a2);
cout << "Output array: [";
```

```
for (size_t i = 0; i < result.size(); i++) {
cout << result[i];
if (i < result.size() - 1) {
cout << ", ";
}
}
cout << "]" << endl;
return 0;
}
```

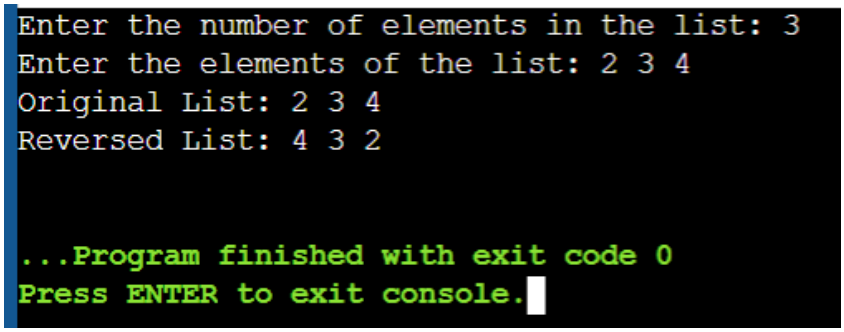
```
Enter the number of elements for the first array (a1): 2
Enter the elements of the first array (a1): 3
12 3 4
Enter the number of elements for the second array (a2): Enter the e
lements of the second array (a2): 2 4 2
Output array: [7, 14]


...Program finished with exit code 0
Press ENTER to exit console.
```

Ques 3. Given the head od singly linked list reverse the list and return the reversed list

```
#include <iostream>
using namespace std;
struct Node {
int data;
Node* next;
};
Node* reverseList(Node* head) {
Node* prev = nullptr;
Node* current = head;
Node* next = nullptr;
while (current != nullptr) {
next = current->next;
```

```
current->next = prev;
prev = current;
current = next;
}
return prev;
}
void printList(Node* head) {
while (head != nullptr) {
cout << head->data << " ";
head = head->next;
}
cout << endl;
}
void appendNode(Node*& head, int data) {
Node* newNode = new Node();
newNode->data = data;
newNode->next = nullptr;
if (head == nullptr) {
head = newNode;
} else {
Node* temp = head;
while (temp->next != nullptr) {
temp = temp->next;
}
temp->next = newNode;
}
}
int main() {
Node* head = nullptr;
int n, value;
```

```
cout << "Enter the number of elements in the list: ";
cin >> n;
cout << "Enter the elements of the list: ";
for (int i = 0; i < n; i++) {
cin >> value;
appendNode(head, value);
}
cout << "Original List: ";
printList(head);
head = reverseList(head);
cout << "Reversed List: ";
printList(head);
return 0;
}
```



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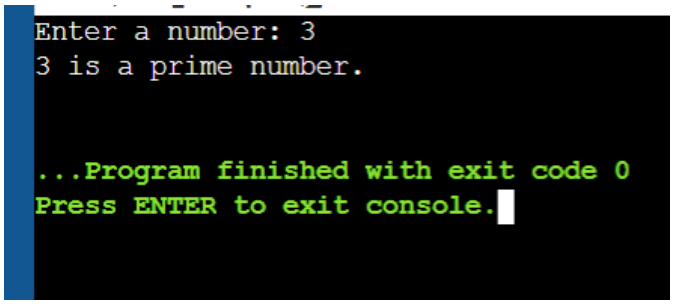
write a function to check if a number is prime or not

```
#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) {
```

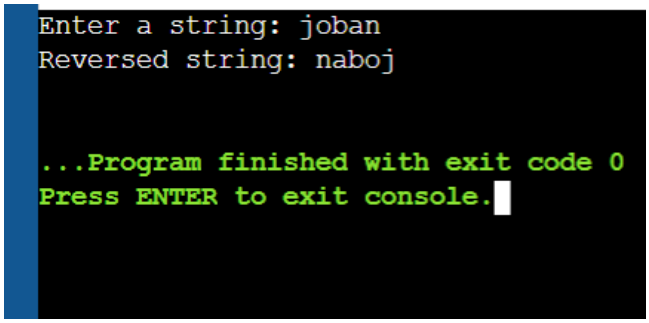
```
return false;
}
}
return true;
}
int main() {
int num;
cout << "Enter a number: ";
cin >> num;
if (isPrime(num)) {
cout << num << " is a prime number." << endl;
} else {
cout << num << " is not a prime number." << endl;
}
return 0;
}
```



Ques 4. write a function to reverse a string

```
#include <iostream>
#include <string>
using namespace std;
string reverseString(string str) {
int n = str.length();
for (int i = 0; i < n / 2; i++) {
swap(str[i], str[n - i - 1]);
```

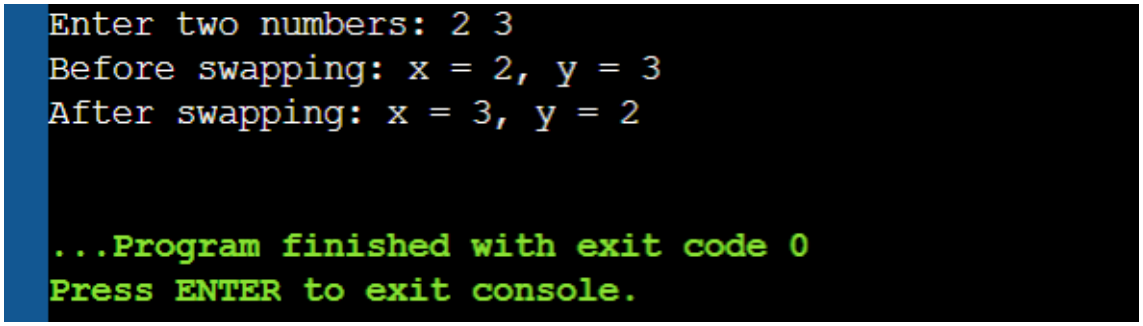
```
}
return str;
}
int main() {
string input;
cout << "Enter a string: ";
getline(cin, input);
string reversed = reverseString(input);
cout << "Reversed string: " << reversed << endl;
return 0;

}
```



Ques 5. Implement a function that swap two variable using pass by reference

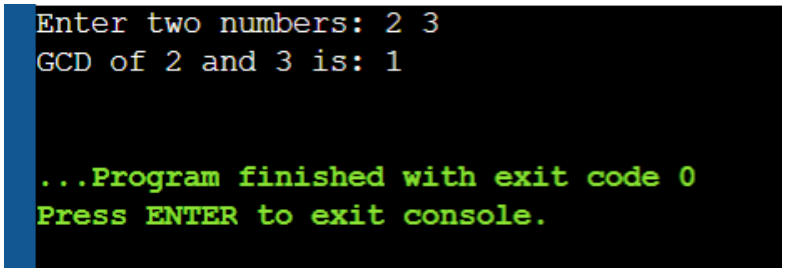
```
#include <iostream>
using namespace std;
void swapValues(int& a, int& b) {
int temp = a;
a = b;
b = temp;
}
int main() {
int x, y;
cout << "Enter two numbers: ";
```

```
cin >> x >> y;
cout << "Before swapping: x = " << x << ", y = " << y << endl;
swapValues(x, y);
cout << "After swapping: x = " << x << ", y = " << y << endl;
return 0;
}
```



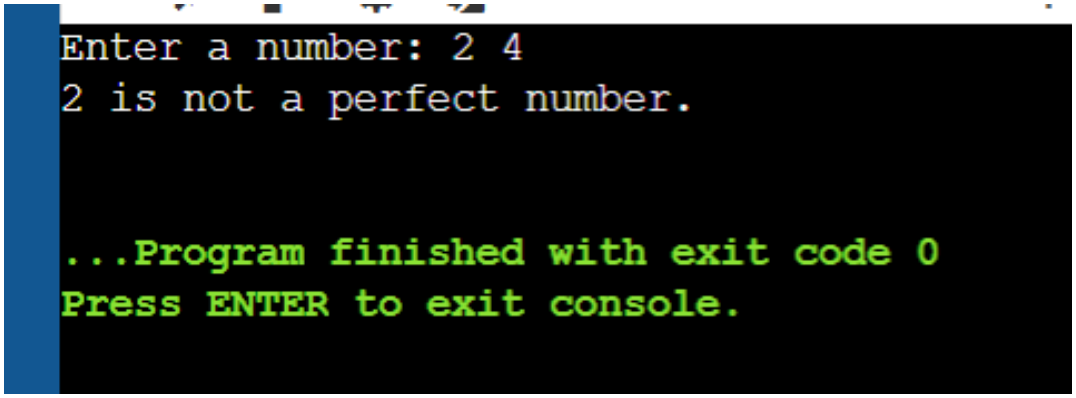
Ques 6. write a recursive function to compute the GCD of two numbers

```
#include <iostream>
using namespace std;
int gcd(int a, int b) {
if (b == 0)
return a;
return gcd(b, a % b);
}
int main() {
int num1, num2;
cout << "Enter two numbers: ";
cin >> num1 >> num2;
int result = gcd(num1, num2);
cout << "GCD of " << num1 << " and " << num2 << " is: " << result << endl;
return 0;
}
```



Ques 7. Check weather number is perfect or not

```
#include <iostream>
using namespace std;
bool isPerfectNumber(int num) {
if (num <= 1) return false;
int sum = 0;
for (int i = 1; i <= num / 2; ++i) {
if (num % i == 0) {
sum += i;
}
}
return sum == num;
}
int main() {
int num;
cout << "Enter a number: ";
cin >> num;
if (isPerfectNumber(num)) {
cout << num << " is a perfect number." << endl;
} else {
cout << num << " is not a perfect number." << endl;
}
return 0;
}
```


Enter a number: 2 4
2 is not a perfect number.
...Program finished with exit code 0
Press ENTER to exit console.