

DAY 3

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22BCS10190

KPIT-901(A)

Q1 . Add Two Numbers

```
day3ques1.cpp > reverseList(ListNode *)
1  #include <iostream>
2  #include <cmath>
3  using namespace std;
4
5  struct ListNode {
6      int val;
7      ListNode* next;
8      ListNode() : val(0), next(nullptr) {}
9      ListNode(int x) : val(x), next(nullptr) {}
10     ListNode(int x, ListNode* next) : val(x), next(next) {}
11 };
12
13 ListNode* reverseList(ListNode* head) {
14     ListNode* prev = nullptr;
15     ListNode* curr = head;
16
17     while (curr) {
18         ListNode* next = curr->next;
19         curr->next = prev;
20         prev = curr;
21         curr = next;
22     }
23     return prev;
24 }
25
26 long long listToNumber(ListNode* head) {
27     long long num = 0;
28     while (head) {
29         num = num * 10 + head->val;
30         head = head->next;
31     }
32     return num;
33 }
34
35 int main() {
36     ListNode* l1 = new ListNode(2, new ListNode(4, new ListNode(3)));
37     ListNode* l2 = new ListNode(5, new ListNode(6, new ListNode(4)));
38     l1 = reverseList(l1);
39     l2 = reverseList(l2);
40
41     long long num1 = listToNumber(l1);
42     long long num2 = listToNumber(l2);
43     long long sum = num1 + num2;
44     cout << "Sum: " << sum << endl;
45
46     return 0;
47 }
```

```
C:\Users\Gaurav Kumar\OneDrive\Desktop\class>cd "C:\Users\Gaurav Kumar\OneDrive\Desktop\class\" && g++ day3ques1.cpp -o day3ques1 && "C:\Users\Gaurav Kumar\OneDrive\Desktop\class\"day3ques1
Sum: 807
```

Q2. Reverse Linked List

```
1  #include <iostream>
2  using namespace std;
3
4  struct ListNode {
5      int val;
6      ListNode* next;
7      ListNode(int x) : val(x), next(nullptr) {}
8  };
9
10 ListNode* reverseList(ListNode* head) {
11     ListNode* prev = nullptr;
12     ListNode* current = head;
13
14     while (current != nullptr) {
15         ListNode* nextNode = current->next;
16         current->next = prev;
17         prev = current;
18         current = nextNode;
19     }
20
21     return prev;
22 }
23
24 void printList(ListNode* head) {
25     while (head != nullptr) {
26         cout << head->val << " ";
27         head = head->next;
28     }
29     cout << endl;
30 }
31
32 ListNode* createList(int n) {
33     if (n == 0) return nullptr;
34     int val;
35     cout << "Enter the value of node 1: ";
36     cin >> val;
37     ListNode* head = new ListNode(val);
38     ListNode* current = head;
39     for (int i = 2; i <= n; ++i) {
40         cout << "Enter the value of node " << i << ": ";
41         cin >> val;
42         current->next = new ListNode(val);
43         current = current->next;
44     }
45     return head;
46 }
47
48 int main() {
49     int n;
50     cout << "Enter the number of nodes in the linked list: ";
51     cin >> n;
52
53     ListNode* head = createList(n);
54
55     cout << "Original Linked List: ";
56     printList(head);
57
58     head = reverseList(head);
59
60     cout << "Reversed Linked List: ";
61     printList(head);
62
63     return 0;
64 }
```

```
C:\Users\Gaurav Kumar\OneDrive\Desktop\class>cd "c:\Users\Gaurav Kumar\OneDrive\Desktop\class\" && g++ day3ques2.cpp -o day3ques2 && "c:\Users\Gaurav Kumar\OneDrive\Desktop\class\"day3ques2
Enter the number of nodes in the linked list: 5
Enter the value of node 1: 2
Enter the value of node 2: 5
Enter the value of node 3: 6
Enter the value of node 4: 7
Enter the value of node 5: 5
Original Linked List: 2 5 6 7 5
Reversed Linked List: 5 7 6 5 2
```

Q3. Fibonacci Series Using Recursion

```
1  #include <iostream>
2  using namespace std;
3
4  int fibonacci(int n) {
5      if (n <= 1) return n;
6      return fibonacci(n - 1) + fibonacci(n - 2);
7  }
8
9  int main() {
10     int n;
11     cout << "Enter the value of n: ";
12     cin >> n;
13     cout << "Fibonacci number F(" << n << ") = " << fibonacci(n) << endl;
14     return 0;
15 }
```

```
C:\Users\Gaurav Kumar\OneDrive\Desktop\class>cd "c:\Users\Gaurav Kumar\OneDrive\Desktop\class\" && g++ day3ques3.cpp -o day3ques3 && "c:\Users\Gaurav Kumar\OneDrive\Desktop\class\day3ques3
Enter the value of n: 8
Fibonacci number F(8) = 21
```

Q4. Power Of Three

```
1  #include <iostream>
2  using namespace std;
3
4  bool isPowerOfThree(int n) {
5      if (n <= 0) return false;
6      while (n % 3 == 0) {
7          n /= 3;
8      }
9      return n == 1;
10 }
11
12 int main() {
13     int n;
14     cout << "Enter an integer: ";
15     cin >> n;
16     if (isPowerOfThree(n)) {
17         cout << n << " is a power of three." << endl;
18     } else {
19         cout << n << " is not a power of three." << endl;
20     }
21     return 0;
22 }
23
```

```
C:\Users\Gaurav Kumar\OneDrive\Desktop\class>cd "c:\Users\Gaurav Kumar\OneDrive\Desktop\class\" && g++ day3ques4.cpp -o day3ques4 && "c:\Users\Gaurav Kumar\OneDrive\Desktop\class\day3ques4
Enter an integer: 27
27 is a power of three.
```

Q5. Wildcard Matching

```
1  #include <iostream>
2  #include <vector>
3  using namespace std;
4
5  bool isMatch(string s, string p) {
6      int m = s.size(), n = p.size();
7
8      vector<vector<bool>> dp(m + 1, vector<bool>(n + 1, false));
9
10     dp[0][0] = true;
11
12     for (int j = 1; j <= n; ++j) {
13         if (p[j - 1] == '*') {
14             dp[0][j] = dp[0][j - 1];
15         }
16     }
17
18     for (int i = 1; i <= m; ++i) {
19         for (int j = 1; j <= n; ++j) {
20             if (p[j - 1] == '*') {
21                 dp[i][j] = dp[i - 1][j] || dp[i][j - 1];
22             } else if (p[j - 1] == '?' || s[i - 1] == p[j - 1]) {
23                 dp[i][j] = dp[i - 1][j - 1];
24             }
25         }
26     }
27
28     return dp[m][n];
29 }
30
31 int main() {
32     string s, p;
33     cout << "Enter the string: ";
34     cin >> s;
35     cout << "Enter the pattern: ";
36     cin >> p;
37
38     if (isMatch(s, p)) {
39         cout << "Pattern matches the string." << endl;
40     } else {
41         cout << "Pattern does not match the string." << endl;
42     }
43
44     return 0;
45 }
```

```
C:\Users\Gaurav Kumar\OneDrive\Desktop\class>cd "c:\Users\Gaurav Kumar\OneDrive\Desktop\class\" && g++ day3ques5.cpp -o day3ques5 && "c:\Users\Gaurav Kumar\OneDrive\Desktop\class\day3ques5
Enter the string: asd
Enter the pattern: asd
Pattern matches the string.
```