

# Recursion-3

## Assignment Solutions



1) Given a positive integer n, return true if it is a power of 2.

Sample Input: 17

Sample Output: false

Sample Input: 32

Sample Output: true

**Code:-**

<https://pastebin.com/RzijVgHd>

```
8  #include<iostream>
9  using namespace std;
10 bool helper(int num)
11 {
12     if(num==1)
13     {
14         return true;
15     }
16     if(num%2!=0 || num ==0)
17     {
18         return false;
19     }
20     return helper(num/2);
21 }
22 int main()
23 {
24     int num=16;
25
26     if(helper(num))
27     {
28         cout<<"True";
29     }else{
30         cout<<"False";
31     }
32 }
33
34
```

True

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

2) Find the first uppercase letter in the given string and return its index. You need to do this recursively. Return -1 in case there is no uppercase character.

Sample Input: physicSwAllaH

Sample Output: 6

Code:-

<https://pastebin.com/FaUHg9vp>

```
8  #include<iostream>
9  using namespace std;
10 int index(string str,int i)
11 {
12     if(str[i]=='\0')
13     {
14         return -1;
15     }
16     if(isupper(str[i]))
17     {
18         return i;
19     }
20     return index(str,i+1);
21 }
22 int main()
23 {
24     string str="physicSwAllaH";
25     cout<<index(str,0);
26 }
27
28
```



```
6
...Program finished with exit code 0
Press ENTER to exit console.□
```

3) Given a string, check if it is a palindrome or not. You need to write a recursive function which checks this.

Sample Input: skills

Sample Output: false

Sample Input: abcdcba

Sample Output: true

Code:-

<https://pastebin.com/8gynqHMK>

```
8  #include<iostream>
9  using namespace std;
10 bool helper(string str,int si,int ei)
11 {
12     if(si>=ei)
13     {
14         return true;
15     }
16     if(str[si]!=str[ei])
17     {
18         return false;
19     }
20     return helper(str,si+1,ei-1);
21 }
22
23 int main()
24 {
25     string str="abcdcba";
26     if(helper(str,0,str.size()-1))
27     {
28         cout<<"true";
29     }else{
30         cout<<"false";
31     }
32 }
33
34
```

true

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

4) Given an integer, write a recursive function which prints the number in reverse order.

Note: the integer number n is  $0 < n < 10000$ . Avoid preceding zeroes.

Sample Input: 12345

Sample Output: 54321

Sample Input: 368900

Sample Output: 9863

Code:-

<https://pastebin.com/XBa5dY3u>

```
8  #include<iostream>
9  using namespace std;
10 void rev(int num)
11 {
12     if(num<10)
13     {
14         cout<<num;
15     }else{
16         cout<<num%10;
17         rev(num/10);
18     }
19 }
20
21 int main()
22 {
23     int num=12345;
24     rev(num);
25 }
26
27
```

54321

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

5) Given an array of integers, print a sum triangle using recursion from it such that the first level has all array elements. After that, at each level the number of elements is one less than the previous level and elements at the level will be the Sum of consecutive two elements in the previous level.

Sample Input: [5,4,3,2,1]

Sample Output:

5, 4, 3, 2, 1  
9, 7, 5, 3  
16, 12, 8  
28, 20  
48

Code:-

<https://pastebin.com/e0Vi6FDd>

```
10 void helper(int arr[], int size)
11 {
12     if (size < 1)
13     {
14         return;
15     }
16     for (int i = 0; i < size; i++)
17     {
18         if (i == size - 1)
19         {
20             cout << arr[i] << " ";
21         }
22         else
23         {
24             cout << arr[i] << ", ";
25         }
26     }
27     cout << endl;
28     int level[size - 1];
29     for (int i = 0; i < size - 1; i++)
30     {
31         int sum = arr[i] + arr[i + 1];
32         level[i] = sum;
33     }
34     helper(level, size - 1);
35 }
36
37
38 int main()
39 {
40     int arr[] = {5, 4, 3, 2, 1};
41     helper(arr, 5);
42 }
```

```
5, 4, 3, 2, 1
9, 7, 5, 3
16, 12, 8
28, 20
48
```