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Branch: CSE(B.TECH)

Q1) Rahul is a traveller. One day he ends up at a place from where he can't move forward without solving a question. He has been asked the number of ways to arrange n files in a row, but the files can be bundled as a bundle of 1 or 3 files only. Help Rahul solve the question, so that he can travel forward.

```cpp
#include<bits/stdc++.h>
using namespace std;

long long dp[1000];

long long num_ways(int n){
      if(n<0) return 0;
      if(n==0) return 1;
      if(dp[n]!=-1) return dp[n];
      long long ans;
      ans=num_ways(n-1)+num_ways(n-3);
      dp[n]=ans;
      return ans;
}


int main(){
      for(int i=0;i<1000;i++)
      dp[i]=-1;
      int n;
      cin>>n;
      cout<<num_ways(n);

      return 0;
}
```

OUTPUT:

```
PS C:\Users\Gaurav\Programming\practice\cp> ./code
4
3
PS C:\Users\Gaurav\Programming\practice\cp> ./code
6
6
```

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Q2) A corporation wishes to update its employee database. This time, they want to create new employee IDs for each employee by encoding their name such that 'A' becomes "1", 'B' becomes "2"...'Z' becomes "26". Assist the organization in creating employee IDs for their employees based on their names.

```cpp
#include<bits/stdc++.h>
using namespace std;

string recursion(string name) {
    if (name.empty()) {
        return "";
    } else {
        int x = name[0] - 'A' + 1;
        string ans = to_string(x);
        return ans + recursion(name.substr(1));
    }
}

int main() {
    string name;
    cin>>name;
    cout<<recursion(name);
    return 0;
}
```

OUTPUT:

```
PS C:\Users\Gaurav\Programming\practice\cp> ./code
AMIT
113920
PS C:\Users\Gaurav\Programming\practice\cp>
```

TIME COMPLEXITY:

The time complexity of this function is O(n) as it takes linear time to process each letter of the name.