



Ques . A monkey hops one, two or three steps at a time. (Only forward jumps). Starting from step number 0, in how many ways can it reach the step number n ?
 $1 \leq n \leq 10^5$

Recursive equation $\rightarrow F[n]=F[n-1]+F[n-2]+F[n-3]$

Top Down Approach

```
int dp[100];
int solve (int x){
    if (x<=1)
        return 1;
    if (x==2)
        return 2;
    if (dp[x]!=-1){ // if (~dp[x]) also //works, think why
        return dp[x];
    }
    int ans = solve(x-1)+solve(x-2)+solve(x-3);
    dp[x]=ans;    // this step is for memoization. As already discussed, once we have calculated
                  // the answer for a particular 'x', we don't want to recompute it.
    return ans;
}

int main(){
    int n;
    // we can also use memset in string.h
    memset(dp,-1,sizeof(dp));
    cin>>n; // read n;
    cout<<"The number of ways is ::"<<solve(n);
    return 0;
}
```

Bottom up Approach

```
int i;  
F[0]=1;  
F[1]=1;  
F[2]=2;  
for (i=3;i<=n;i++){  
    F[i]=F[i-1]+F[i-2]+F[i-3];  
}
```