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Exp no:4

Program 1:

```
#include <stdio.h>
```

```
long long countWays(int n)
```

```
{
    long long dp[n + 1];
    for (int i = 0; i <= n; i++)
    {
        dp[i] = 0;
    }
    dp[0] = 1;
    for (int i = 1; i <= n; i++)
    {
        if (i >= 1)
        {
            dp[i] += dp[i - 1];
        }
        if (i >= 3)
        {
            dp[i] += dp[i - 3];
        }
    }
    return dp[n];
}
```

```
int main()
{
    int n;
    scanf("%d", &n);
    printf("%lld\n", countWays(n));
    return 0;
}
```

Output:

	Input	Expected	Got	
✓	6	6	6	✓
✓	25	8641	8641	✓
✓	100	24382819596721629	24382819596721629	✓

Passed all tests! ✓

Program 2:

```
#include <stdio.h>
int max(int a, int b)
{
    return a > b ? a : b;
}
int main()
{
    int n;
    scanf("%d", &n);
    int board[n][n], dp[n][n];
    for (int i = 0; i < n; i++)
        for (int j = 0; j < n; j++)
            scanf("%d", &board[i][j]);
    dp[0][0] = board[0][0];
    for (int i = 1; i < n; i++)
    {
        dp[i][0] = dp[i-1][0] + board[i][0];
        dp[0][i] = dp[0][i-1] + board[0][i];
    }
    for (int i = 1; i < n; i++)
        for (int j = 1; j < n; j++)
            dp[i][j] = board[i][j] + max(dp[i-1][j], dp[i][j-1]);
    printf("%d\n", dp[n-1][n-1]);
    return 0;
}
```

Output:

	Input	Expected	Got	
✓	3 1 2 4 2 3 4 8 7 1	19	19	✓
✓	3 1 3 1 1 5 1 4 2 1	12	12	✓
✓	4 1 1 3 4 1 5 7 8 2 3 4 6 1 6 9 0	28	28	✓

Passed all tests! ✓

Program 3:

```
#include <stdio.h>
#include <string.h>
int main() {
    char s1[100], s2[100];
    scanf("%s %s", s1, s2);
    int m = strlen(s1), n = strlen(s2);
    int dp[101][101] = {0};
    for(int i = 1; i <= m; i++) {
        for(int j = 1; j <= n; j++) {
            dp[i][j] = (s1[i-1] == s2[j-1]) ?
                dp[i-1][j-1] + 1 :
                (dp[i-1][j] > dp[i][j-1] ? dp[i-1][j] : dp[i][j-1]);
        }
    }
    printf("%d", dp[m][n]);
    return 0;
}
```

Output:

	Input	Expected	Got	
✓	aab azb	2	2	✓
✓	ABCD ABCD	4	4	✓

Passed all tests! ✓

Program 4:

```
#include <stdio.h>
```

```
int main() {
```

```
    int n;
```

```
    scanf("%d", &n);
```

```
    int a[n], dp[n];
```

```
    for(int i = 0; i < n; i++) {
```

```
        scanf("%d", &a[i]);
```

```
        dp[i] = 1;
```

```
    }
```

```
    for(int i = 1; i < n; i++) {
```

```
        for(int j = 0; j < i; j++) {
```

```
            if(a[i] >= a[j] && dp[i] < dp[j] + 1)
```

```
                dp[i] = dp[j] + 1;
```

```
        }
```

```
    }
```

```
    int max = 0;
```

```
    for(int i = 0; i < n; i++)
```

```
        if(dp[i] > max) max = dp[i];
```

```
    printf("%d", max);
```

```
    return 0;
```

```
}
```

Output:

	Input	Expected	Got	
✓	9 -1 3 4 5 2 2 2 2 3	6	6	✓
✓	7 1 2 2 4 5 7 6	6	6	✓

Passed all tests! ✓