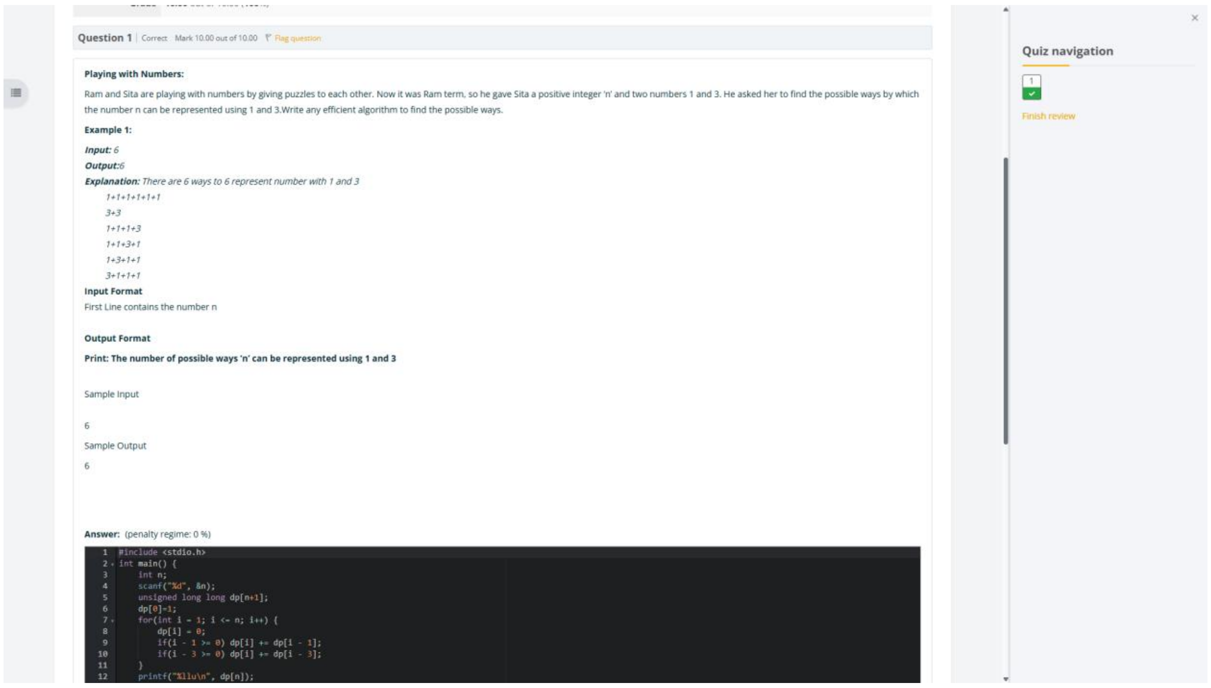
DYNAMIC PROGRAMMING



Question 1 | Correct Mark 10.00 out of 10.00 Flag question

Playing with Numbers:

Ram and Sita are playing with numbers by giving puzzles to each other. Now it was Ram term, so he gave Sita a positive integer 'n' and two numbers 1 and 3. He asked her to find the possible ways by which the number n can be represented using 1 and 3.Write any efficient algorithm to find the possible ways.

Example 1:

Input: *6*
Output:*6*
Explanation: *There are 6 ways to 6 represent number with 1 and 3*

1+1+1+1+1+1
3+3
1+1+1+3
1+1+3+1
1+3+1+1
3+1+1+1

Input Format

First Line contains the number n

Output Format

Print: The number of possible ways 'n' can be represented using 1 and 3

Sample Input

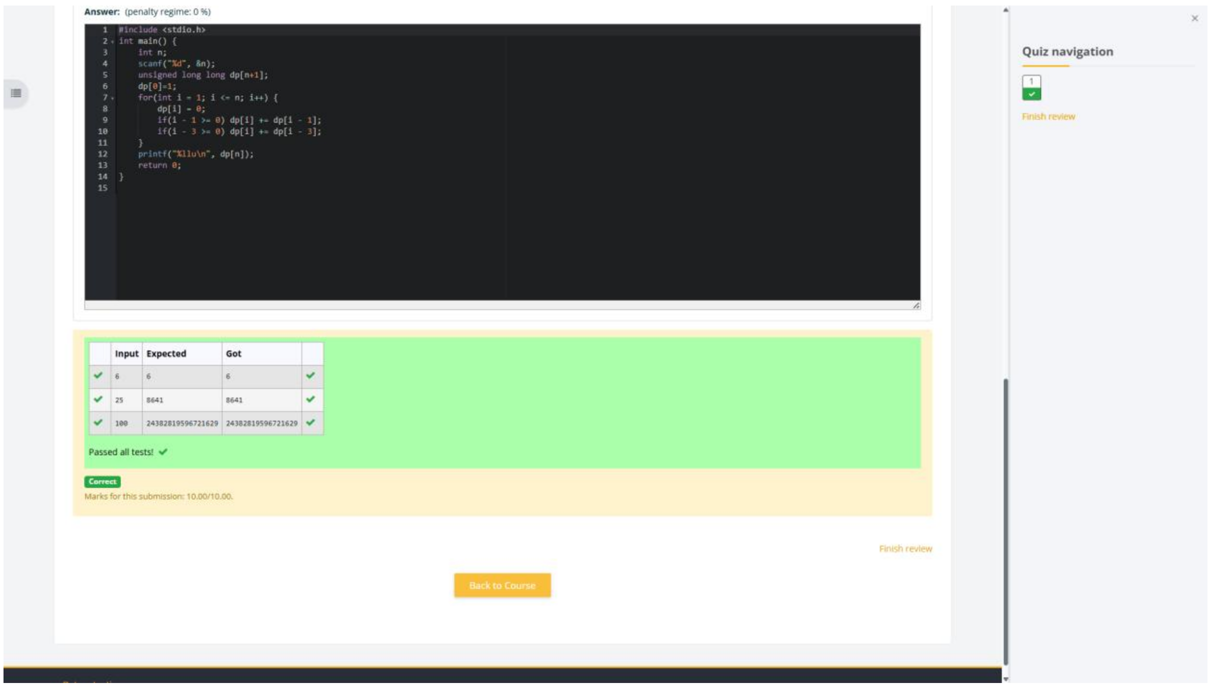
6

Sample Output

6

Answer: (penalty regime: 0 %)

```c
#include <stdio.h>
int main() {
    int n;
    scanf("%d", &n);
    unsigned long long dp[n+1];
    dp[0]=1;
    for(int i = 1; i <= n; i++) {
        dp[i] = 0;
        if(i - 1 >= 0) dp[i] += dp[i - 1];
        if(i - 3 >= 0) dp[i] += dp[i - 3];
    }
    printf("%llu\n", dp[n]);
```



Answer: (penalty regime: 0 %)

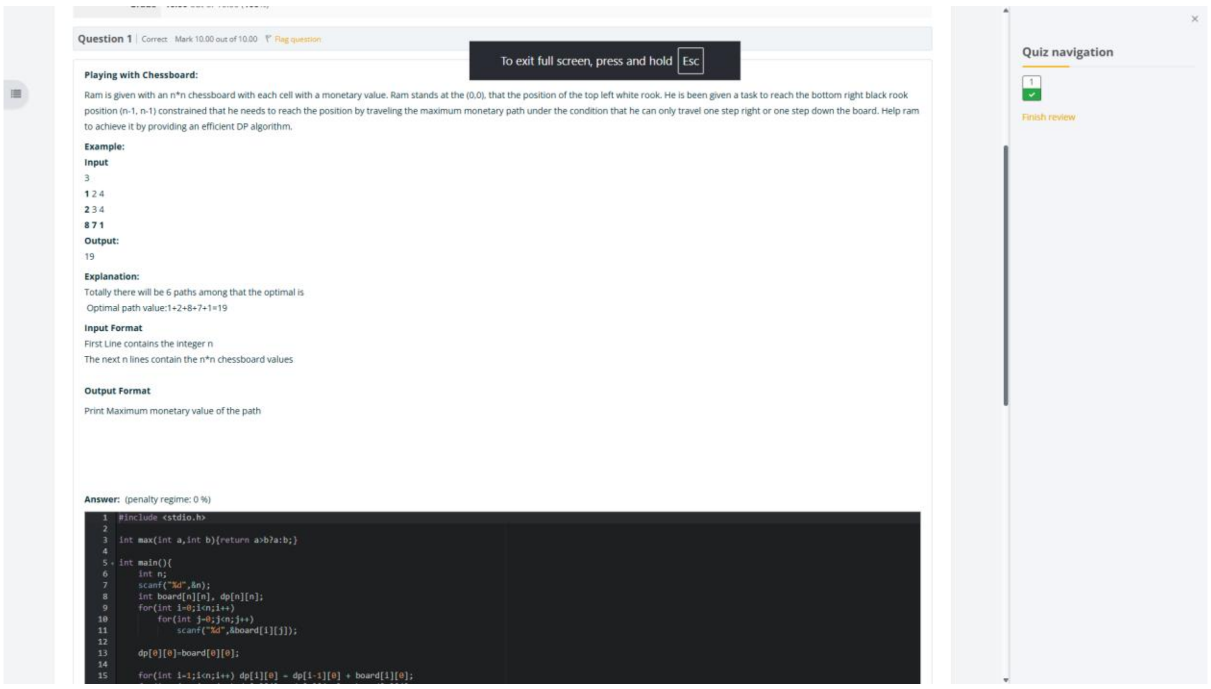
```c
#include <stdio.h>
int main() {
    int n;
    scanf("%d", &n);
    unsigned long long dp[n+1];
    dp[0]=1;
    for(int i = 1; i <= n; i++) {
        dp[i] = 0;
        if(i - 1 >= 0) dp[i] += dp[i - 1];
        if(i - 3 >= 0) dp[i] += dp[i - 3];
    }
    printf("%llu\n", dp[n]);
    return 0;
}
```

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

Passed all tests! ✓

Correct

Marks for this submission: 10.00/10.00.



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Playing with Chessboard:

Ram is given with an n*n chessboard with each cell with a monetary value. Ram stands at the (0,0), that the position of the top left white rook. He is been given a task to reach the bottom right black rook position (n-1, n-1) constrained that he needs to reach the position by traveling the maximum monetary path under the condition that he can only travel one step right or one step down the board. Help ram to achieve it by providing an efficient DP algorithm.

Example:

Input

3

1 2 4

2 3 4

8 7 1

Output:

19

Explanation:

Totally there will be 6 paths among that the optimal is

Optimal path value:1+2+8+7+1=19

Input Format

First Line contains the integer n

The next n lines contain the n*n chessboard values

Output Format

Print Maximum monetary value of the path

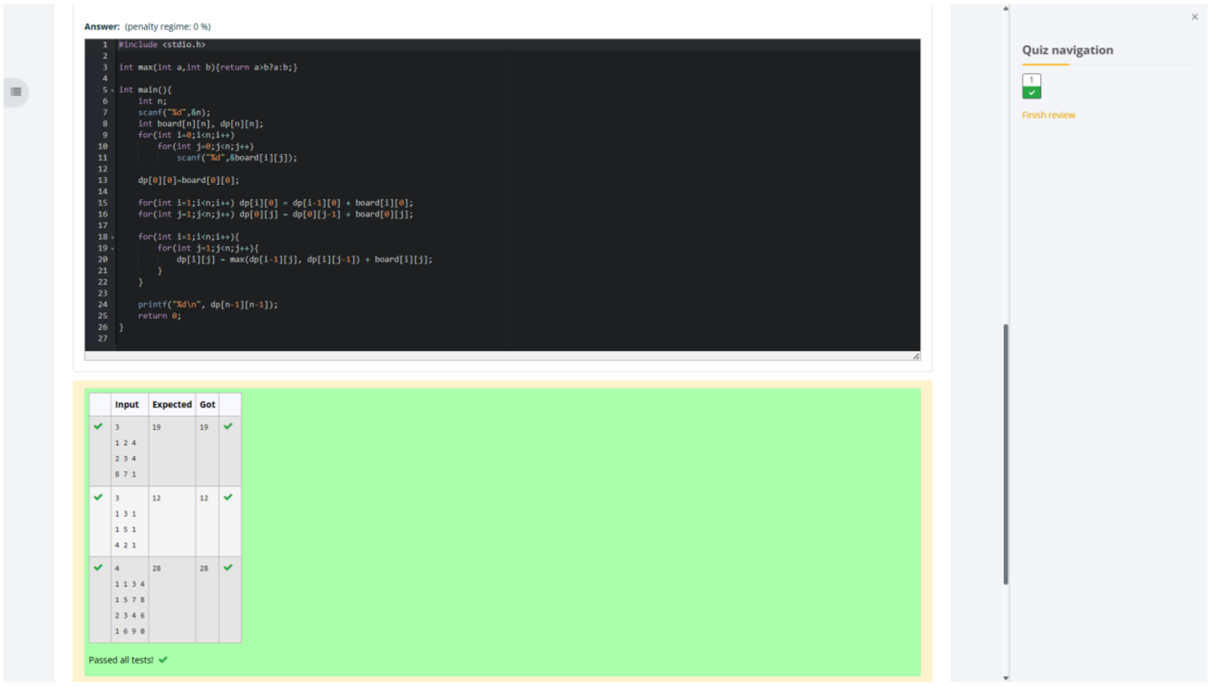
Answer: (penalty regime: 0 %)

```c
#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];
```

Quiz navigation

1

Finish review



Answer: (penalty regime: 0 %)

```c
#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];
    for(int j=1;j<n;j++) dp[0][j] = dp[0][j-1] + board[0][j];

    for(int i=1;i<n;i++){
        for(int j=1;j<n;j++){
            dp[i][j] = max(dp[i-1][j], dp[i][j-1]) + board[i][j];
        }
    }

    printf("%d\n", dp[n-1][n-1]);
    return 0;
}
```

	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! ✓

Quiz navigation

1

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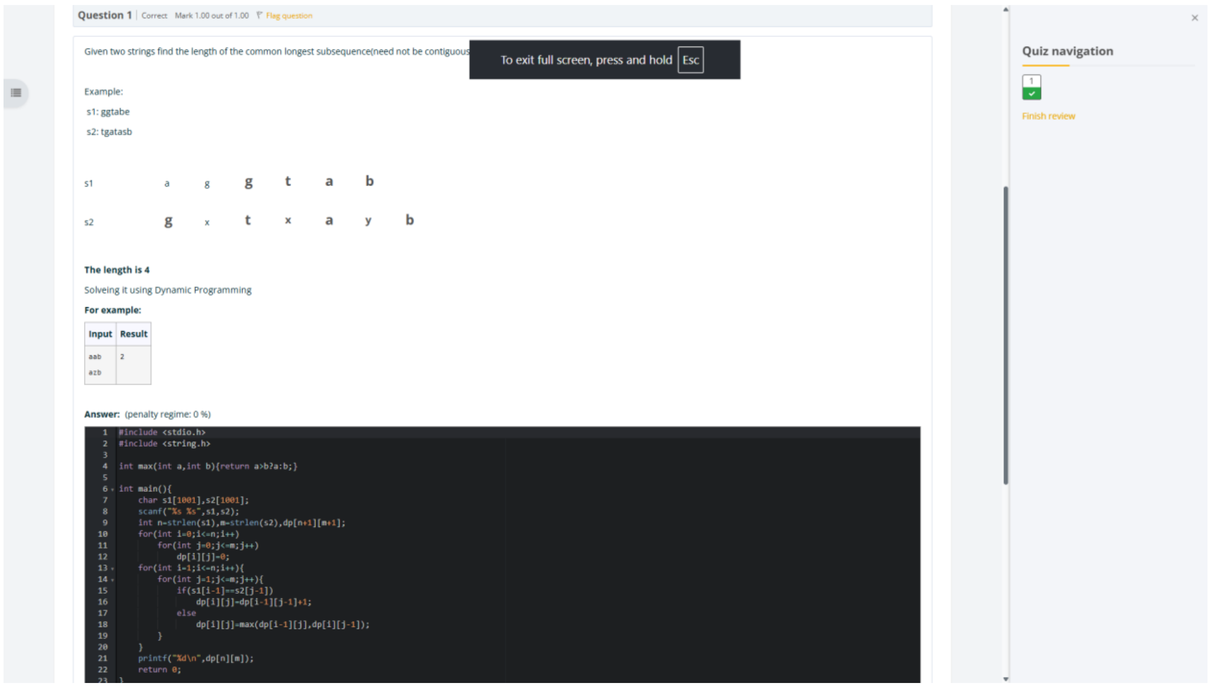

Question 1 | Correct Mark 1.00 out of 1.00 Flag question

Given two strings find the length of the common longest subsequence(need not be contiguous

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Example:

s1: ggtabe

s2: tgatasb

s1	a	g	g	t	a	b	
s2	g	x	t	x	a	y	b

The length is 4

Solveing it using Dynamic Programming

For example:

Input	Result
aab azb	2

Answer: (penalty regime: 0 %)

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

int max(int a,int b){return a>b?a:b;}

int main(){
    char s1[1001],s2[1001];
    scanf("%s %s",s1,s2);
    int n=strlen(s1),m=strlen(s2),dp[n+1][m+1];
    for(int i=0;i<=n;i++)
        for(int j=0;j<=m;j++)
            dp[i][j]=0;
    for(int i=1;i<=n;i++){
        for(int j=1;j<=m;j++){
            if(s1[i-1]==s2[j-1])
                dp[i][j]=dp[i-1][j-1]+1;
            else
                dp[i][j]=max(dp[i-1][j],dp[i][j-1]);
        }
    }
    printf("%d\n",dp[n][m]);
    return 0;
}
```

Quiz navigation

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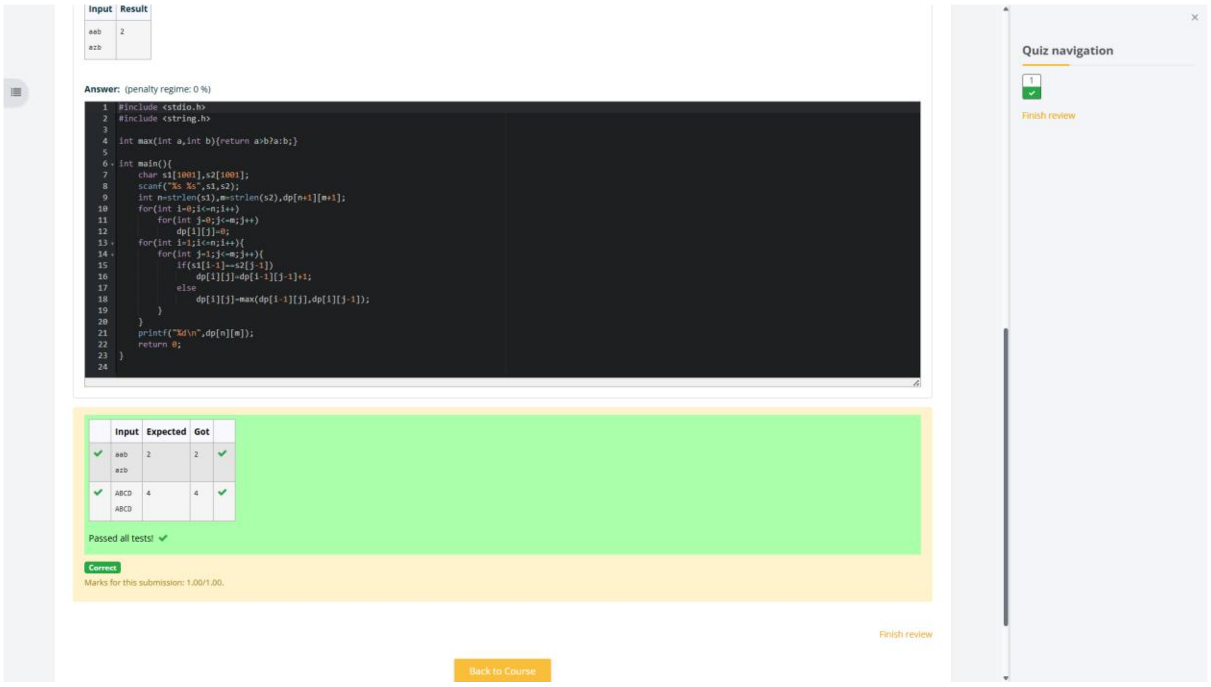

Input	Result
aab azb	2

Answer: (penalty regime: 0 %)

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

int max(int a,int b){return a>b?a:b;}

int main(){
    char s1[1001],s2[1001];
    scanf("%s %s",s1,s2);
    int n=strlen(s1),m=strlen(s2),dp[n+1][m+1];
    for(int i=0;i<=n;i++)
        for(int j=0;j<=m;j++)
            dp[i][j]=0;
    for(int i=1;i<=n;i++){
        for(int j=1;j<=m;j++){
            if(s1[i-1]==s2[j-1])
                dp[i][j]=dp[i-1][j-1]+1;
            else
                dp[i][j]=max(dp[i-1][j],dp[i][j-1]);
        }
    }
    printf("%d\n",dp[n][m]);
    return 0;
}
```

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

Passed all tests! ✓

Correct

Marks for this submission: 1.00/1.00.

Finish review

Back to Course

Quiz navigation

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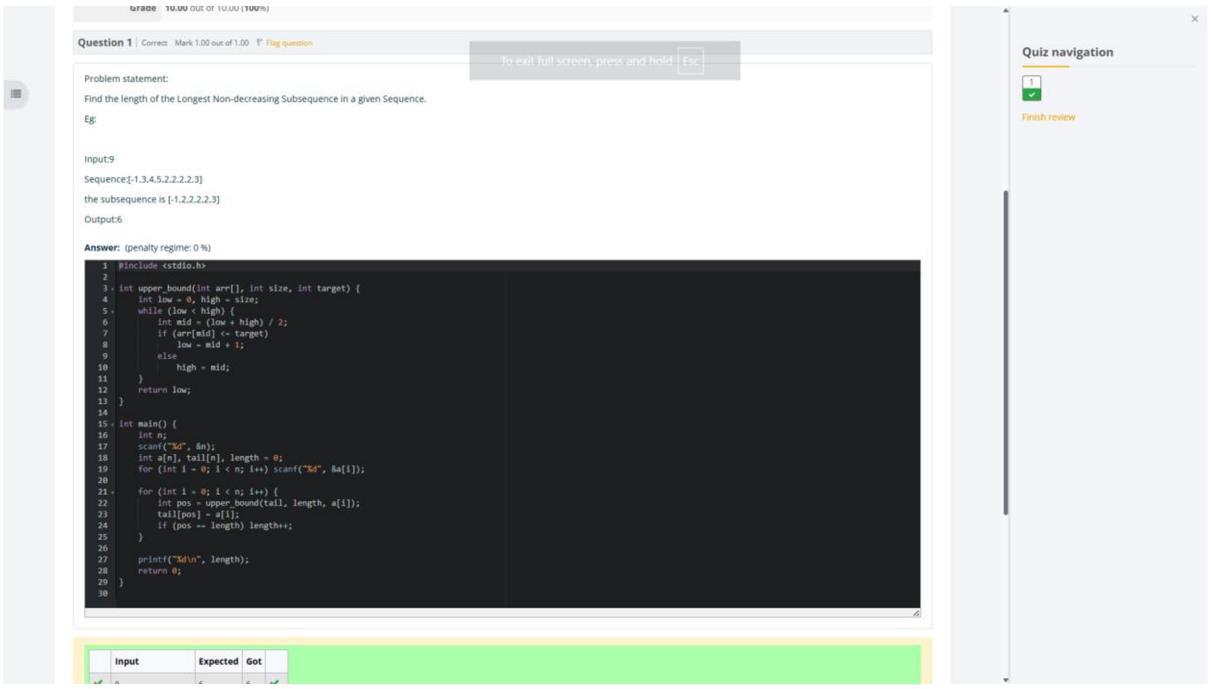
Finish review



Grade 10.00 out of 10.00 (100%)

Question 1 | Correct Mark 1.00 out of 1.00 Flag question

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Problem statement:

Find the length of the Longest Non-decreasing Subsequence in a given Sequence.

Eg:

Input:9

Sequence:[-1.3.4.5.2.2.2.2.3]

the subsequence is [-1.2.2.2.2.3]

Output:6

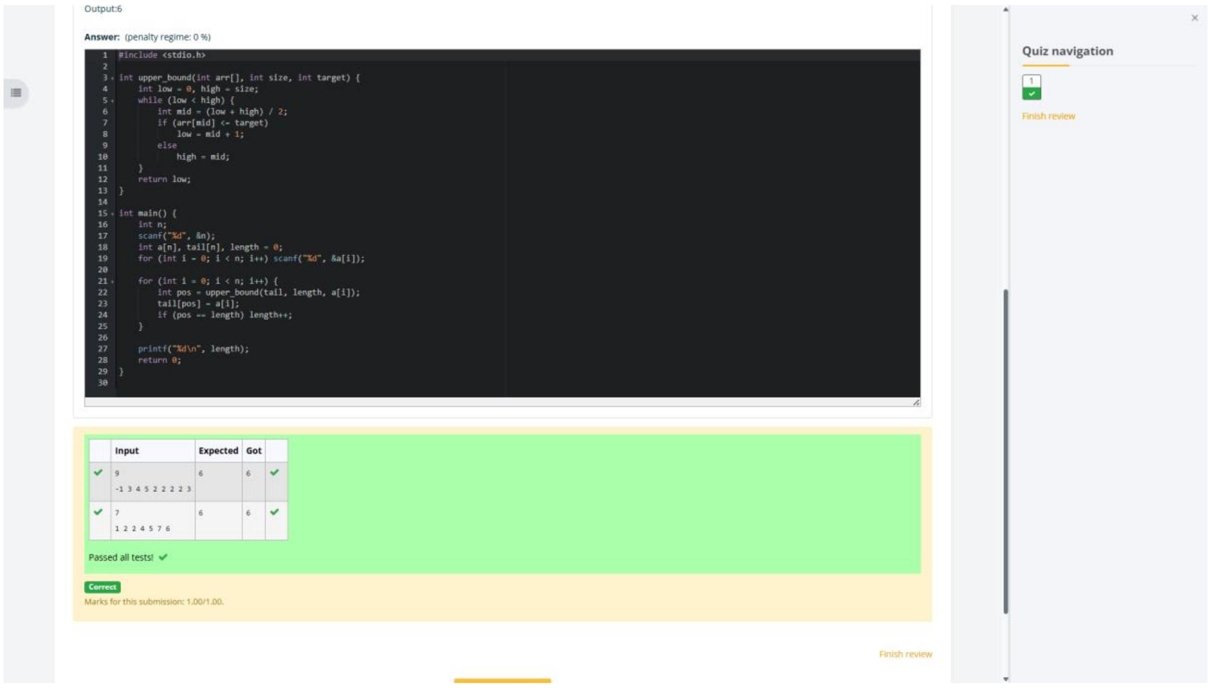
Answer: (penalty regime: 0 %)

```c
#include <stdio.h>

int upper_bound(int arr[], int size, int target) {
    int low = 0, high = size;
    while (low < high) {
        int mid = (low + high) / 2;
        if (arr[mid] <= target)
            low = mid + 1;
        else
            high = mid;
    }
    return low;
}

int main() {
    int n;
    scanf("%d", &n);
    int a[n], tail[n], length = 0;
    for (int i = 0; i < n; i++) scanf("%d", &a[i]);

    for (int i = 0; i < n; i++) {
        int pos = upper_bound(tail, length, a[i]);
        tail[pos] = a[i];
        if (pos == length) length++;
    }

    printf("%d\n", length);
    return 0;
}

```

Quiz navigation

1 ✓

Finish review



Output:6

Answer: (penalty regime: 0 %)

```c
#include <stdio.h>

int upper_bound(int arr[], int size, int target) {
    int low = 0, high = size;
    while (low < high) {
        int mid = (low + high) / 2;
        if (arr[mid] <= target)
            low = mid + 1;
        else
            high = mid;
    }
    return low;
}

int main() {
    int n;
    scanf("%d", &n);
    int a[n], tail[n], length = 0;
    for (int i = 0; i < n; i++) scanf("%d", &a[i]);

    for (int i = 0; i < n; i++) {
        int pos = upper_bound(tail, length, a[i]);
        tail[pos] = a[i];
        if (pos == length) length++;
    }

    printf("%d\n", length);
    return 0;
}

```

	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! ✓

Correct

Marks for this submission: 1.00/1.00.

Finish review

Quiz navigation

1 ✓

Finish review