Programming using C

week 14 practice session and coding

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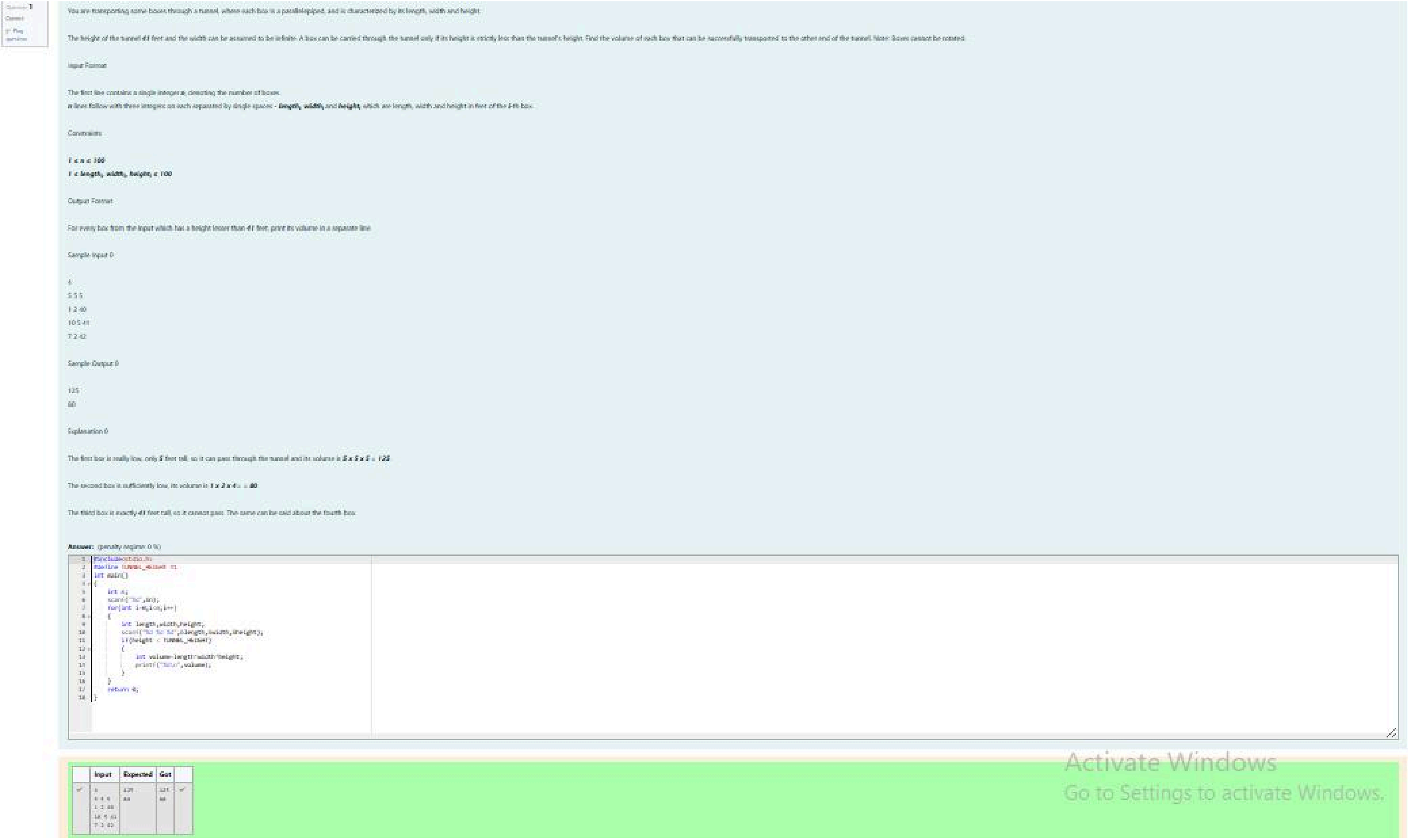


Question 1

Correct

Flag question

You are transporting some boxes through a tunnel, where each box is a parallelepiped, and is characterized by its length, width and height.

The height of the tunnel *41* feet and the width can be assumed to be infinite. A box can be carried through the tunnel only if its height is strictly less than the tunnel's height. Find the volume of each box that can be successfully transported to the other end of the tunnel. Note: Boxes cannot be rotated.

Input Format

The first line contains a single integer *n*, denoting the number of boxes.
n lines follow with three integers on each separated by single spaces - ***$length_i$***, ***$width_i$*** and ***$height_i$*** which are length, width and height in feet of the *i-th* box.

Constraints

$1 \le n \le 100$
$1 \le length_i, width_i, height_i \le 100$

Output Format

For every box from the input which has a height lesser than *41* feet, print its volume in a separate line.

Sample Input 0

```
4
5 5 5
1 2 40
10 5 41
7 2 42
```

Sample Output 0

```
125
80
```

Explanation 0

The first box is really low, only *5* feet tall, so it can pass through the tunnel and its volume is ***$5 \times 5 \times 5 = 125$***.

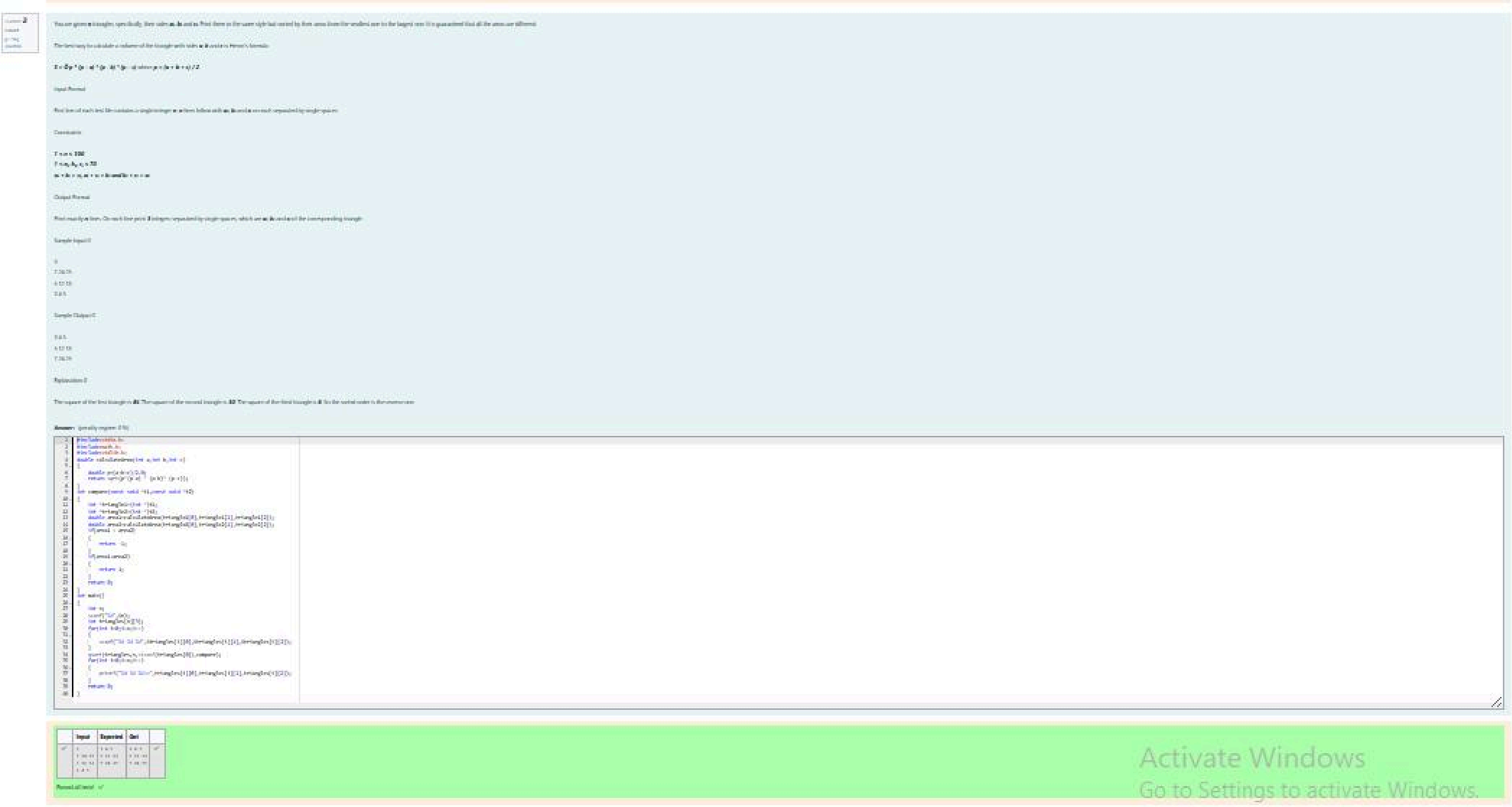
The second box is sufficiently low, its volume is ***$1 \times 2 \times 40 = 80$***.

The third box is exactly *41* feet tall, so it cannot pass. The same can be said about the fourth box.

Answer: (penalty regime: 0 %)

```c
#include<stdio.h>
#define TUNNEL_HEIGHT 41
int main()
{
    int n;
    scanf("%d",&n);
    for(int i=0;i<n;i++)
    {
        int length,width,height;
        scanf("%d %d %d",&length,&width,&height);
        if(height < TUNNEL_HEIGHT)
        {
            int volume=length*width*height;
            printf("%d\n",volume);
        }
    }
    return 0;
}
```

	Input	Expected	Got	
✓	4 5 5 5 1 2 40 10 5 41 7 2 42	125 80	125 80	✓



Question 2
Correct
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question

You are given n triangles, specifically, their sides a_i, b_i and c_i. Print them in the same style but sorted by their areas from the smallest one to the largest one. It is guaranteed that all the areas are different.

The best way to calculate a volume of the triangle with sides a, b and c is Heron's formula:

$S = \sqrt{p * (p - a) * (p - b) * (p - c)}$ where $p = (a + b + c) / 2$.

Input Format

First line of each test file contains a single integer n. n lines follow with a_i, b_i and c_i on each separated by single spaces.

Constraints

$1 \le n \le 100$
$1 \le a_i, b_i, c_i \le 70$
$a_i + b_i > c_i$, $a_i + c_i > b_i$ and $b_i + c_i > a_i$

Output Format

Print exactly n lines. On each line print 3 integers separated by single spaces, which are a_i, b_i and c_i of the corresponding triangle.

Sample Input 0

```
3
7 24 25
5 12 13
3 4 5
```

Sample Output 0

```
3 4 5
5 12 13
7 24 25
```

Explanation 0

The square of the first triangle is **84**. The square of the second triangle is **30**. The square of the third triangle is **6**. So the sorted order is the reverse one.

Answer: (penalty regime: 0 %)

```c
#include<stdio.h>
#include<math.h>
#include<stdlib.h>
double calculateArea(int a,int b,int c)
{
    double p=(a+b+c)/2.0;
    return sqrt(p*(p-a)*(p-b)*(p-c));
}
int compare(const void *t1,const void *t2)
{
    int *triangle1=(int *)t1;
    int *triangle2=(int *)t2;
    double area1=calculateArea(triangle1[0],triangle1[1],triangle1[2]);
    double area2=calculateArea(triangle2[0],triangle2[1],triangle2[2]);
    if(area1 < area2)
    {
        return -1;
    }
    if(area1>area2)
    {
        return 1;
    }
    return 0;
}
int main()
{
    int n;
    scanf("%d",&n);
    int triangles[n][3];
    for(int i=0;i<n;i++)
    {
        scanf("%d %d %d",&triangles[i][0],&triangles[i][1],&triangles[i][2]);
    }
    qsort(triangles,n,sizeof(triangles[0]),compare);
    for(int i=0;i<n;i++)
    {
        printf("%d %d %d\n",triangles[i][0],triangles[i][1],triangles[i][2]);
    }
    return 0;
}
```

	Input	Expected	Got	
✓	3 7 24 25 5 12 13 3 4 5	3 4 5 5 12 13 7 24 25	3 4 5 5 12 13 7 24 25	✓

Passed all tests! ✓