StructuresandUnions

Ex.No.:   **Date:**

BoxesthroughaTunnel

ProblemStatement:

Youaretransportingsomeboxesthroughatunnel,whereeachboxisaparallelepiped,   and   is characterized by its length, width and height. Theheightofthetunnel41feetandthewidthcanbeassumedtobeinfinite.Aboxcanbe carried through the tunnel only if its height is strictly less than the tunnel's height. Find the volumeofeachboxthatcanbesuccessfullytransportedtotheotherendofthetunnel.

Note:Boxescannotberotated.

InputFormat
Thefirstlinecontainsasingleintegern,denotingthenumberofboxes. nlinesfollowwiththreeintegersoneachseparatedbysinglespaces-length$_i$,width$_i$and height$_i$whichare length, width and height infeet ofthei-th box.

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

OutputFormat
Foreveryboxfromtheinputwhichhasaheightlesserthan41feet,printitsvolumeina separate line.

SampleInput
4
555
1240
10541
7242

Sample Output
125
80

Explanation
The first box is really low, only 5 feet tall, so it can pass through the tunnel and its volumeis 5 x 5 x 5 = 125.

Thesecondboxissufficientlylow,itsvolumeis1x2x4==80.

Thethirdboxisexactly41feettall,soitcannotpass.Thesamecanbesaidaboutthefourth box.

Program:

```c
#include<stdio.h>
int main()
{
    int n;
    scanf("%d",&n);
    for(int i=0;i<n;i++)
    {
        int len,bre,high;
        scanf("%d %d%d",&len,&bre,&high);
        if(high<41){
            int volume=len*bre*high;;
            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	✓

Passed all tests! ✓

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Ex.No.:   **Date:**

Small Triangles, LargeTriangles

ProblemStatement:

Youaregiven n triangles,specifically,theirsides a_i, b_i and c_i.Printthem in the same style butsortedbytheirareasfromthesmallestonetothelargestone.Itisguaranteedthatall the areas are different.

Thebestwaytocalculateavolumeofthetrianglewithsidesa,bandcisHeron'sformula: $S = \sqrt{p}$

$* (p - a) * (p - b) * (p - c)$ where $p = (a + b + c) / 2$.

InputFormat
Firstlineofeachtestfilecontainssingleintegern.nlinesfollowwith 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 $b_i + c_i > a_i$

OutputFormat
Printexactly n lines.On each line print 3 integers separated bysinglespaces,whichare ai, bi and ci of the corresponding triangle.

SampleInput
3
72425
51213
345

Sample Output
3 4 5
51213
72425

Explanation
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.

```c
25  triangle triangles[n];
26 ▾ for(int i=0;i<n;i++){
27          int a,b,c;
28          scanf("%d %d %d",&a,&b,&c);
29          triangles[i].a=a;
30          triangles[i].b=b;
31          triangles[i].c=c;
32          triangles[i].area=calculate_area(a,b,c);
33
34  }
35  qsort(triangles,n,sizeof(triangle),compare);
36 ▾ for(int i=0;i<n;i++){
37          printf("%d %d %d\n",triangles[i].a,triangles[i].b,triangle
38  }
39
40
41
42  }
```

```c
25  triangle triangles[n];
26 ▾ for(int i=0;i<n;i++){
27      int a,b,c;
28      scanf("%d %d %d",&a,&b,&c);
29      triangles[i].a=a;
30      triangles[i].b=b;
31      triangles[i].c=c;
32      triangles[i].area=calculate_area(a,b,c);
33
34  }
35  qsort(triangles,n,sizeof(triangle),compare);
36 ▾ for(int i=0;i<n;i++){
37      printf("%d %d %d\n",triangles[i].a,triangles[i].b,triangle
38  }
39
40
41
42  }
```

```c
#include<math.h>
#include<stdlib.h>
typedef struct{
    int a,b,c;
    double area;
}triangle;
double calculate_area(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){
    triangle *tri1=(triangle*)t1;
    triangle *tri2=(triangle*)t2;
    if(tri1->area < tri2->area)
    return -1;
    if(tri1->area > tri2->area)
    return 1;
    return 0;
}
int main()
{
    int n;
    scanf("%d",&n);
```

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

Passed all tests! ✓