

Q5- Particles

Problem Description

There is a cube of height H , and there are 4 moving particles on the vertical edges of the cube. Initially particles are at some height A , B , C and D respectively. These particles are moving in different direction (Only upward or downward, no sideways movement) with different speed.

If the particle is moving upward or downward reaches the tip of the cube then it remain at the tip only and will not move further. If other particles have not reach the tip they continue to move along their respective edges in their respective direction till the last particle reaches the tip.

These 4 particles will make two triangles in a 3-D plane. Since the particles are moving, sum of the area of these two triangles will change every moment.

Find out the maximum and minimum of the sum of the areas of these two triangles.

Refer the Examples section for better understanding.

Constraints

$$1 \leq H \leq 100$$

$$0 \leq A, B, C, D \leq H$$

$$0 \leq V_1, V_2, V_3, V_4 \leq 100$$

Input

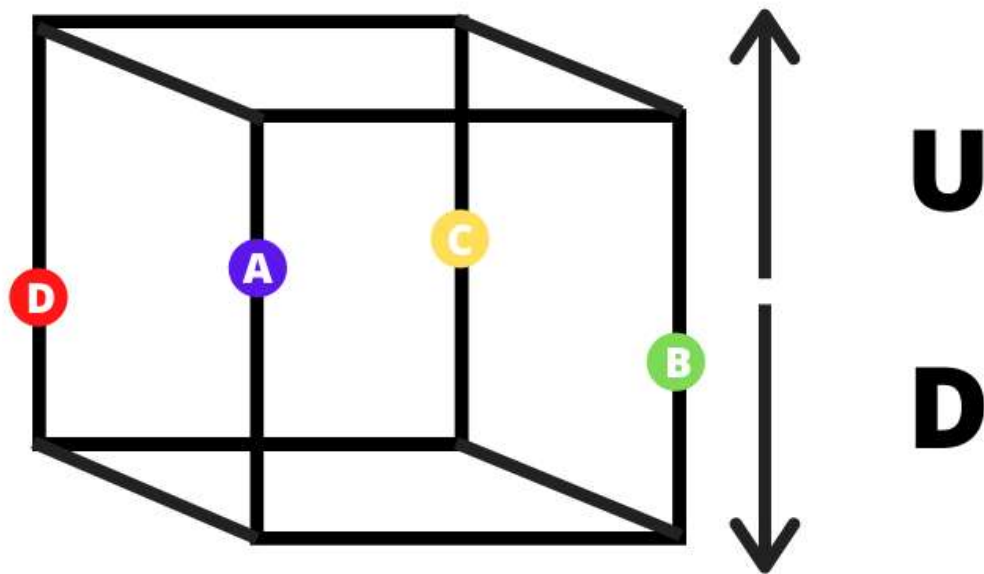
First line contains an integer H which denotes the length of the side of cube.

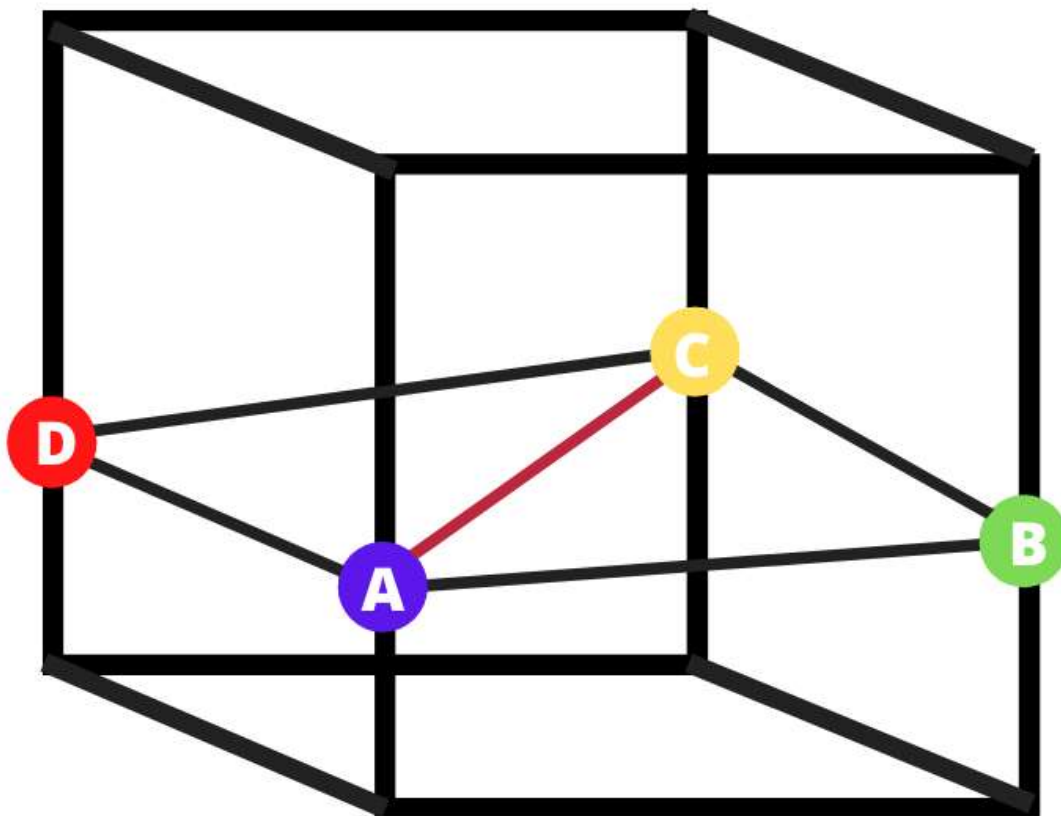
Second line contains 4 space separated integers denoting the initial position of all 4 particles on the 4 vertical edges, say A , B , C and D respectively.

Third line contains 4 space separated integers denoting the speed of all particles, say V_1 , V_2 , V_3 , and V_4 per time unit respectively.

Fourth line contains 4 space separated characters U or D denoting the direction of movement of particles. U denotes the upward direction and D denotes the downward direction.

Direction of movement





Output

Print 2 space separated integers which denote the value

$[4 * [\text{Max}(\text{sum of area of triangle ABC and area of triangle ADC})]^2]$ and
 $[4 * [\text{Min}(\text{sum of area of triangle ABC and area of triangle ADC})]^2]$

respectively. If the above values are decimal value round them off to nearest integer.

Time Limit

1

Examples

Example 1

Input

10

5 5 5 5

1 1 1 1

U U D D

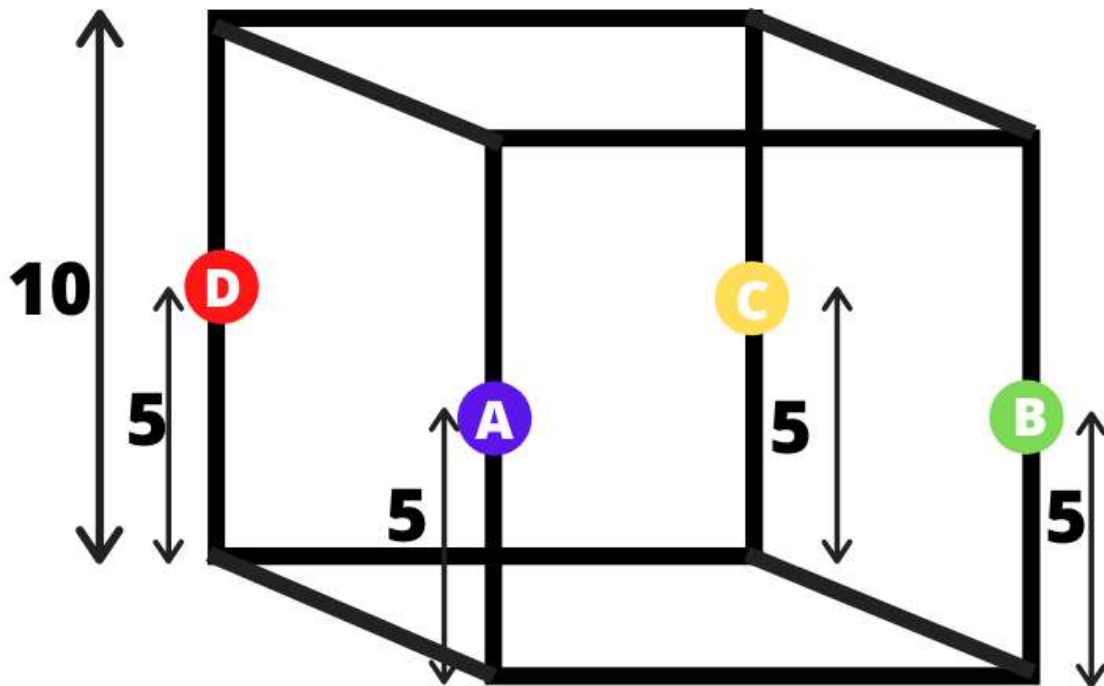
Output

80000 40000

Explanation

The movement per time unit is depicted as shown in the diagrams below.

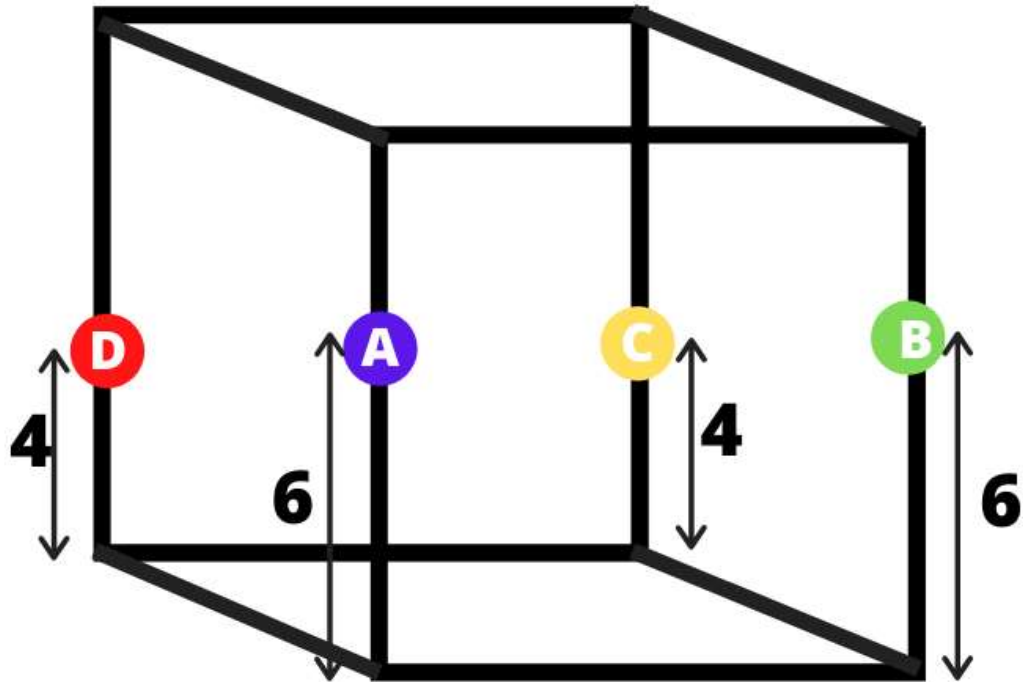
Initial state



MAXAREA: 40000

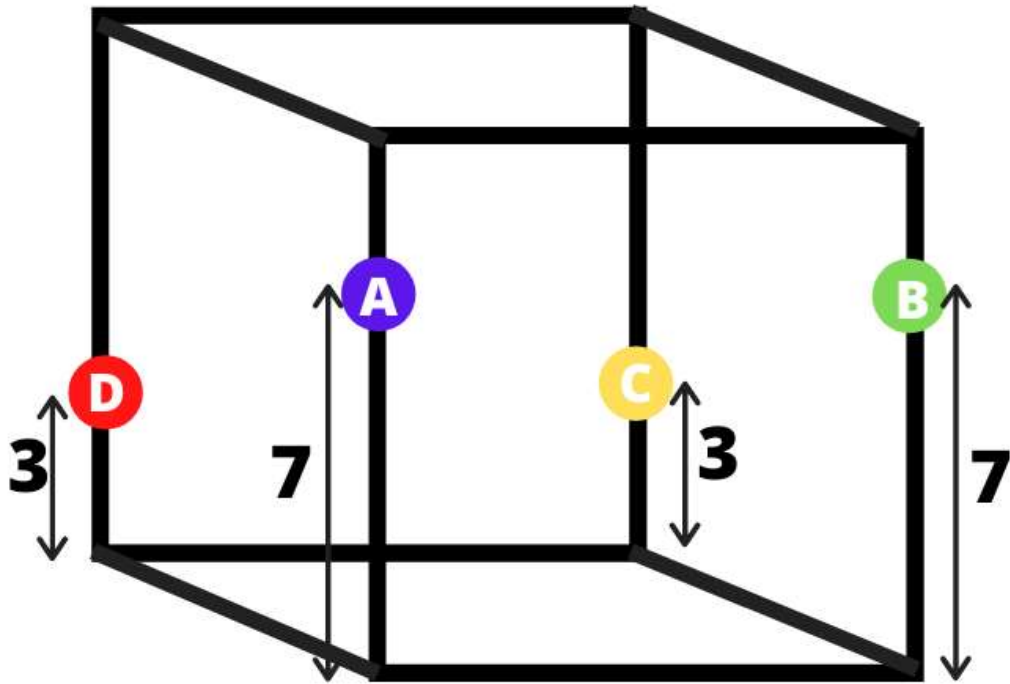
MINAREA : 40000

State1



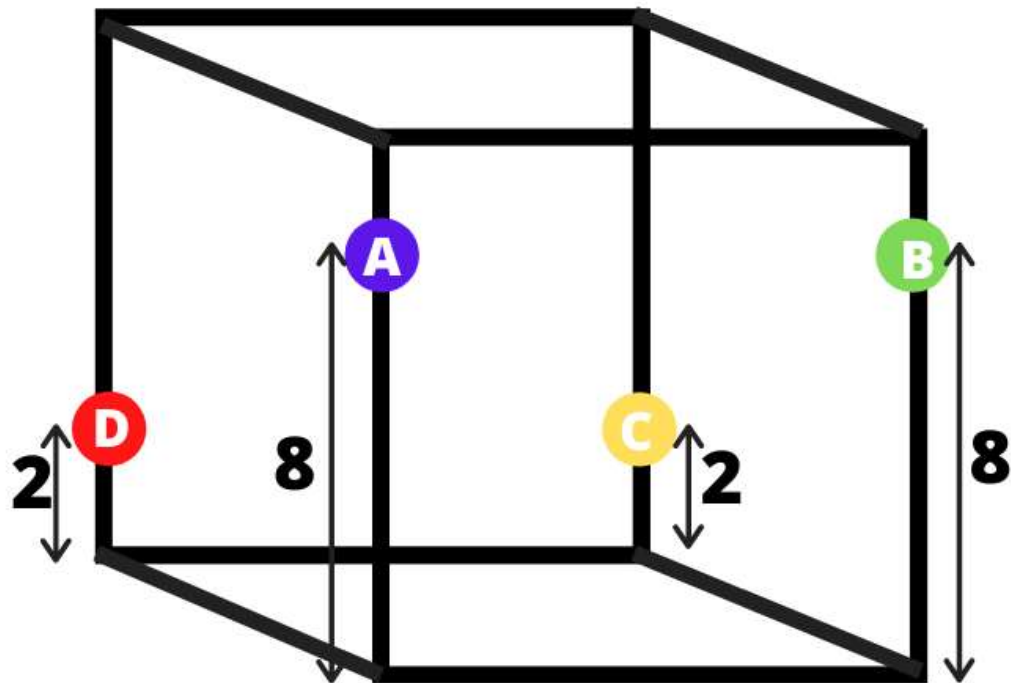
MAXAREA: 41600
MINAREA : 40000

State2



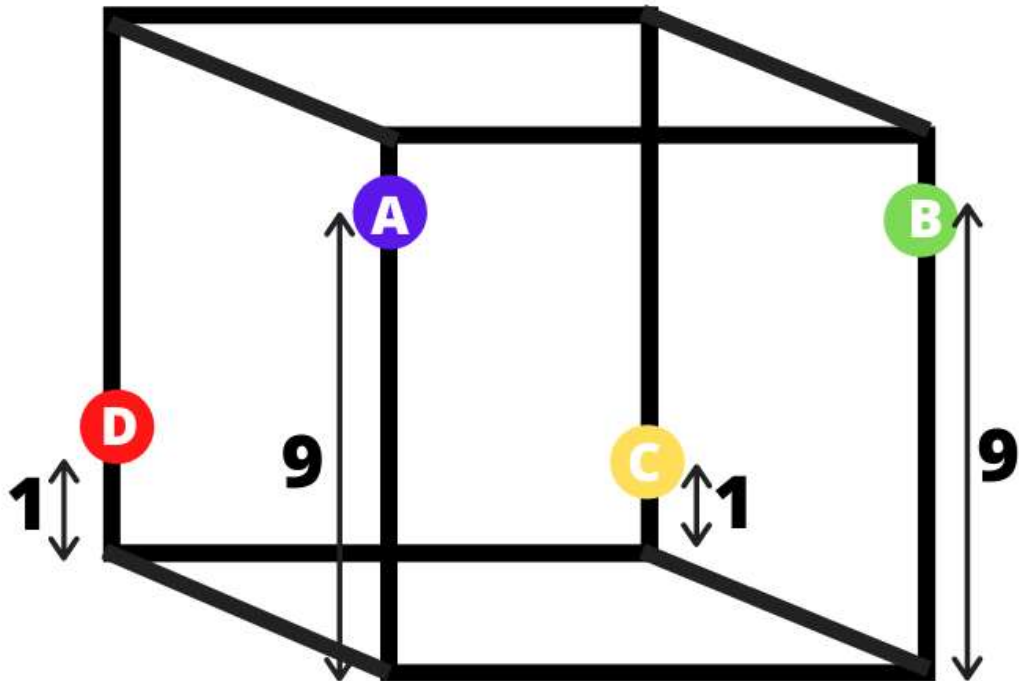
MAXAREA: 46400
MINAREA : 40000

State3



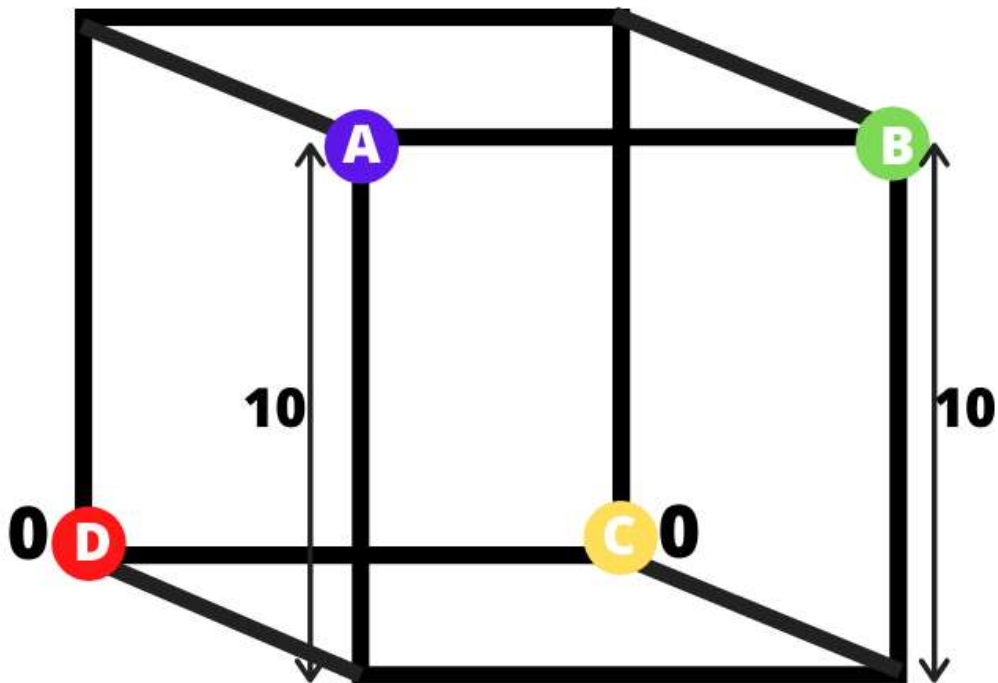
MAXAREA: 54400
MINAREA : 40000

State4



MAXAREA: 65600
MINAREA : 40000

State5



MAXAREA : 80000
MINAREA : 40000

Note: Within a state the area of sum of triangle ABC and triangle ADC is constant. The MAXAREA and MINAREA terms used in the diagrams above are used to keep a track of maximum area and minimum area achieved until that point in time.

$$\text{MAXAREA} = [4 * [\text{Max} (\text{sum of area of triangle ABC and area of triangle ADC})]^2]$$

$$\text{MINAREA} = [4 * [\text{Min} (\text{sum of area of triangle ABC and area of triangle ADC})]^2]$$

Example 2

Input

10

5 5 5 5

1 2 1 2

D U U D

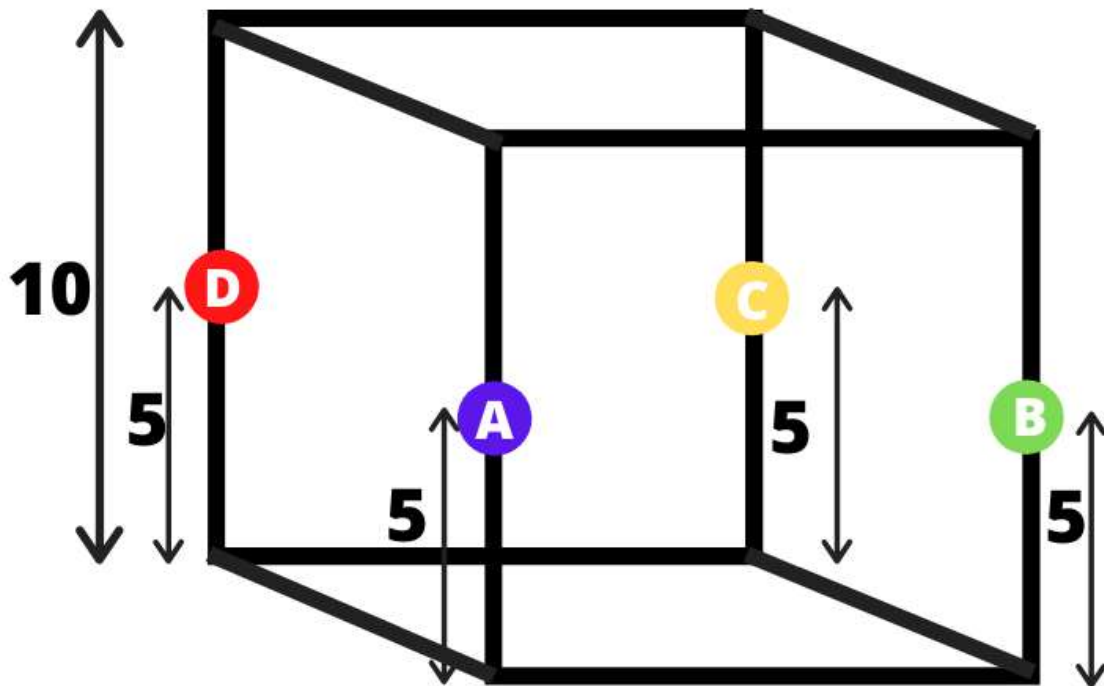
Output

80000 40000

Explanation

The movement per time unit is depicted as shown in the diagrams below.

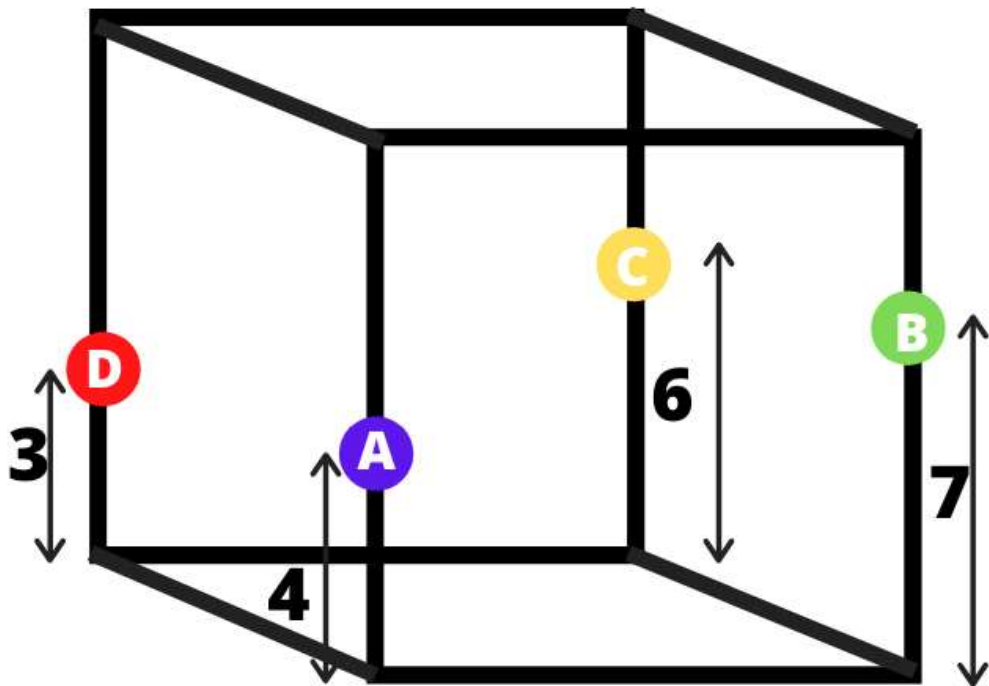
Initial state



MAXAREA: 40000

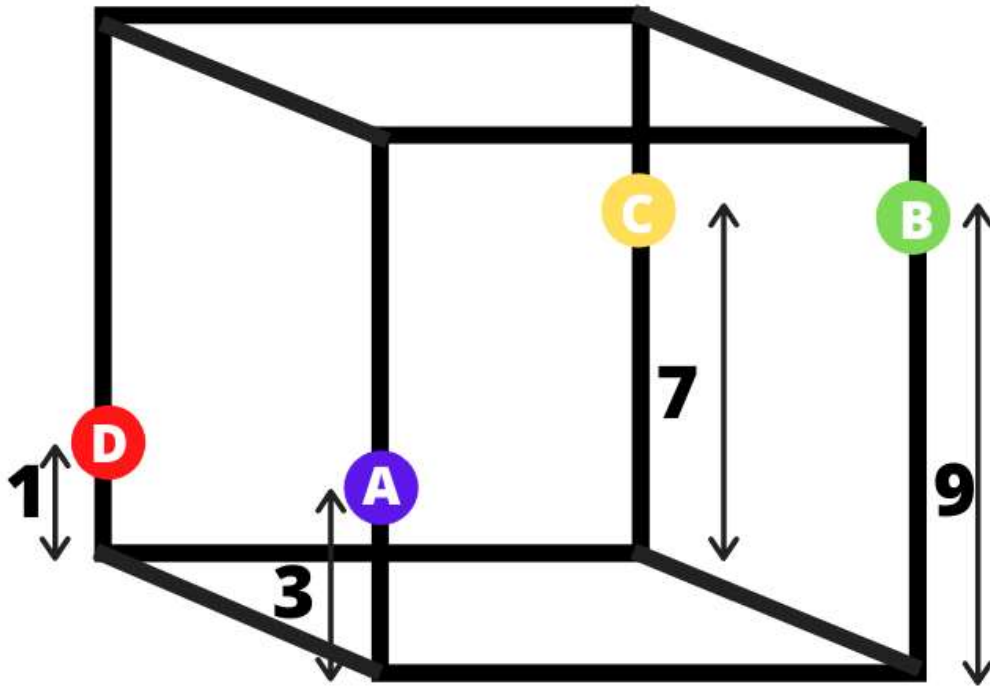
MINAREA : 40000

State1



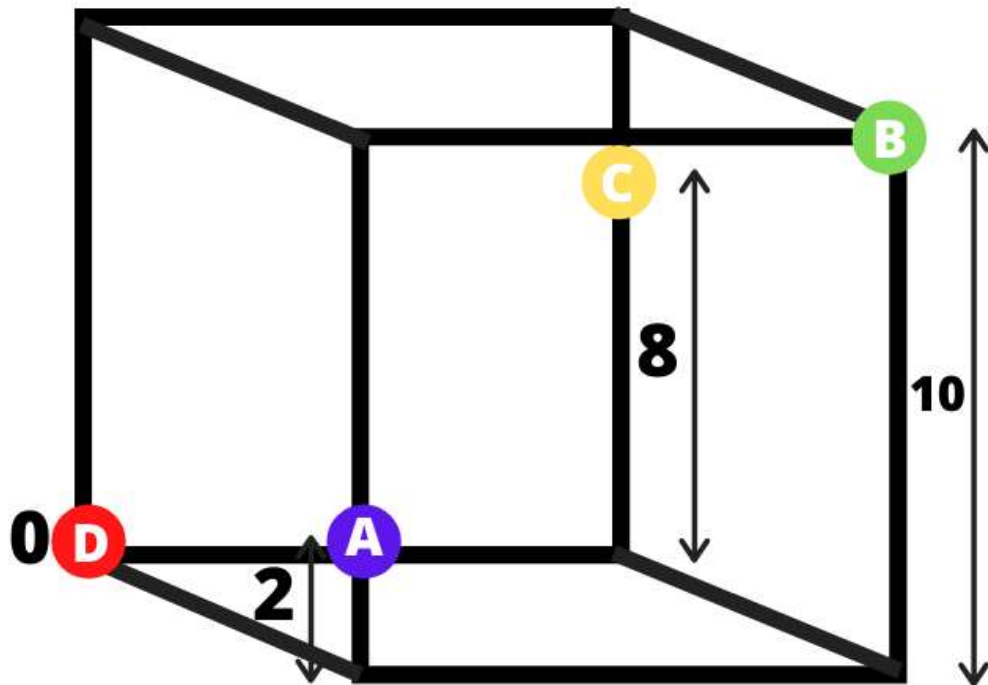
MAXAREA: 44000
MINAREA : 40000

State2



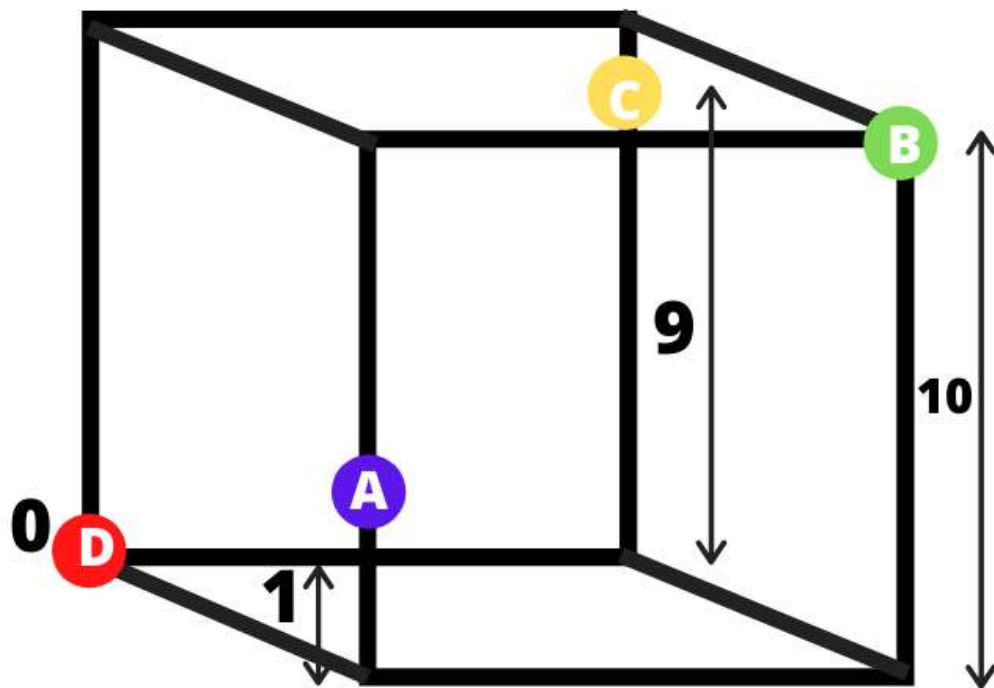
MAXAREA: 56000
MINAREA : 40000

State3



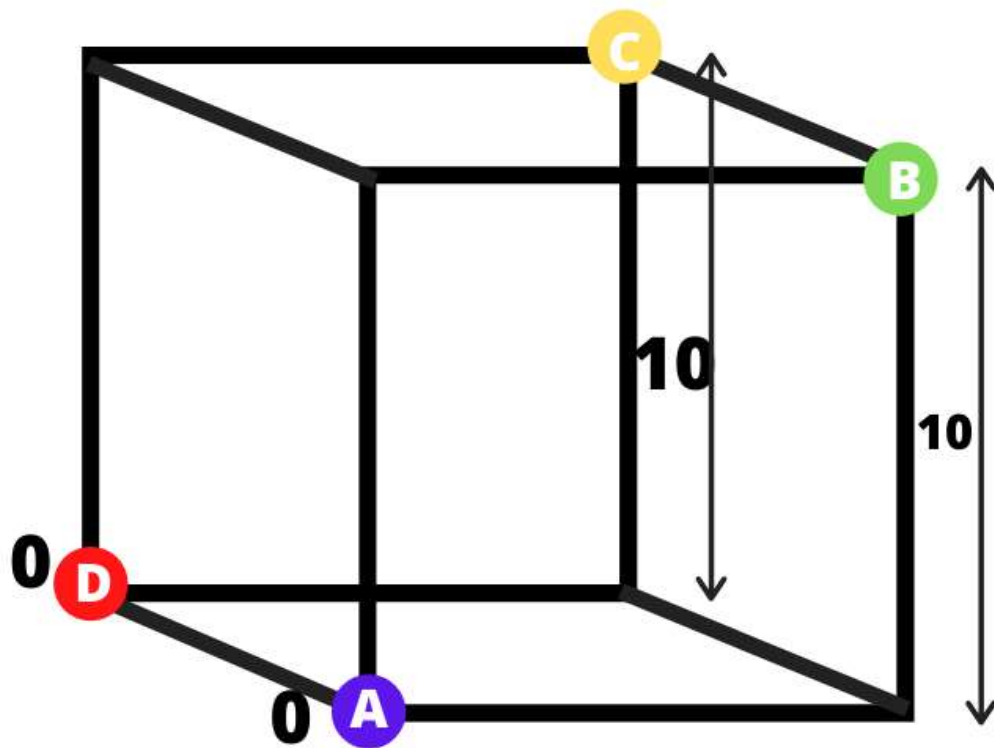
MAXAREA: 67200
MINAREA : 40000

State4



MAXAREA: 72800
MINAREA : 40000

State5



MAXAREA: 80000
MINAREA : 40000

Note: Within a state the area of sum of triangle ABC and triangle ADC is constant. The MAXAREA and MINAREA terms used in the diagrams above are used to keep a track of maximum area and minimum area achieved until that point in time.

$$\text{MAXAREA} = [4 * [\text{Max} (\text{sum of area of triangle ABC and area of triangle ADC})]^2$$

$$\text{MINAREA} = [4 * [\text{Min} (\text{sum of area of triangle ABC and area of triangle ADC})]^2]$$

Example 3

Input

10

5 5 5 5

1 1 1 1

U D U D

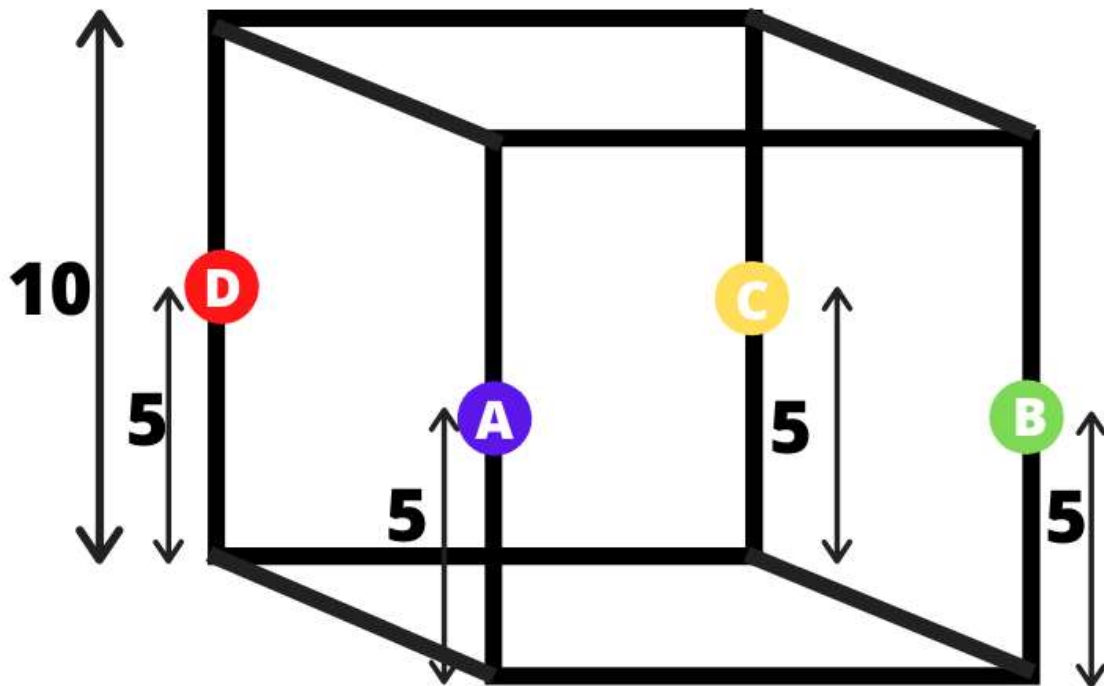
Output

120000 40000

Explanation

The movement per time unit is depicted as shown in the diagrams below.

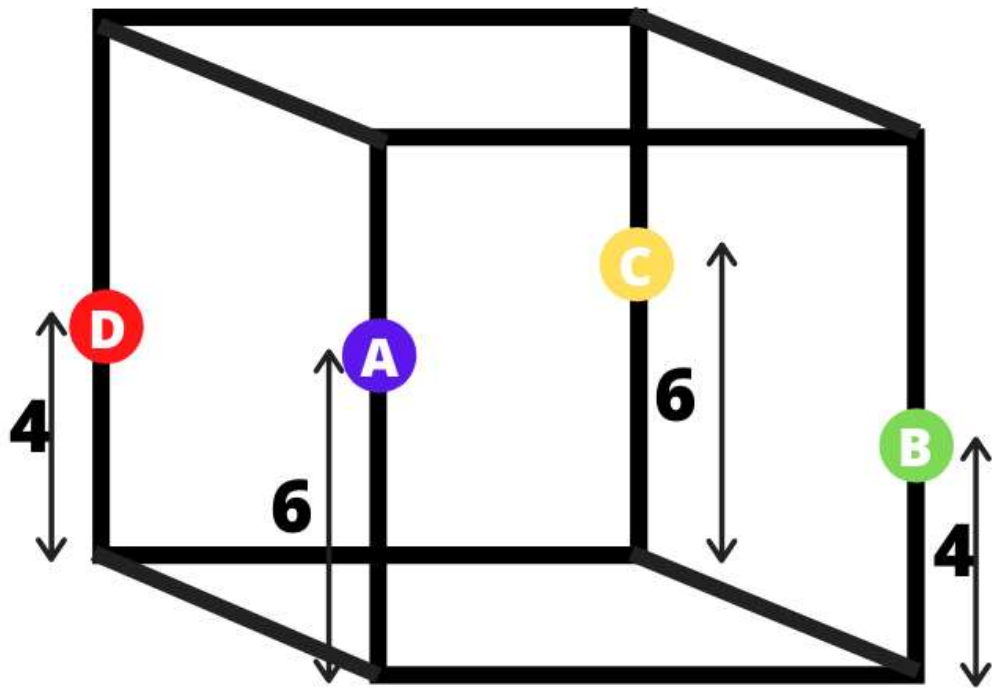
Initial state



MAXAREA: 40000

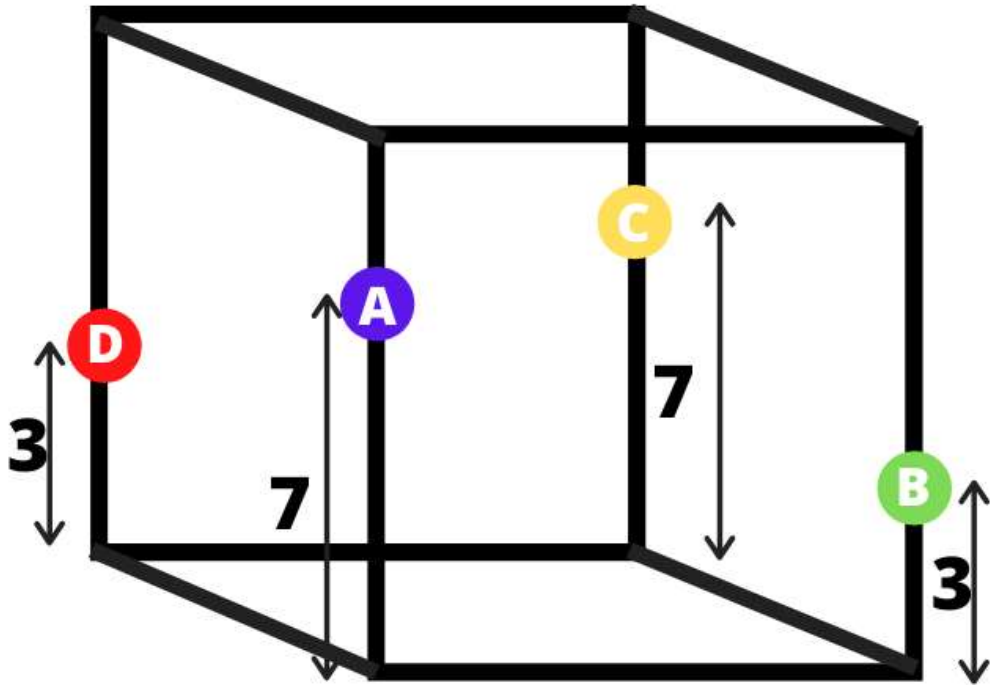
MINAREA : 40000

State1



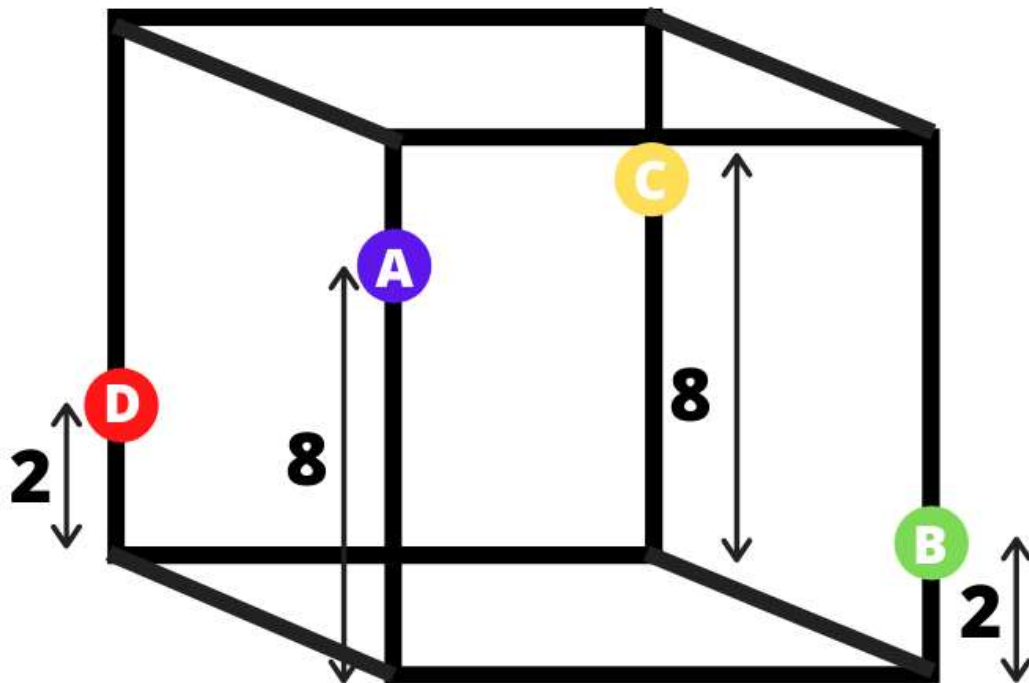
MAXAREA: 43200
MINAREA : 40000

State2



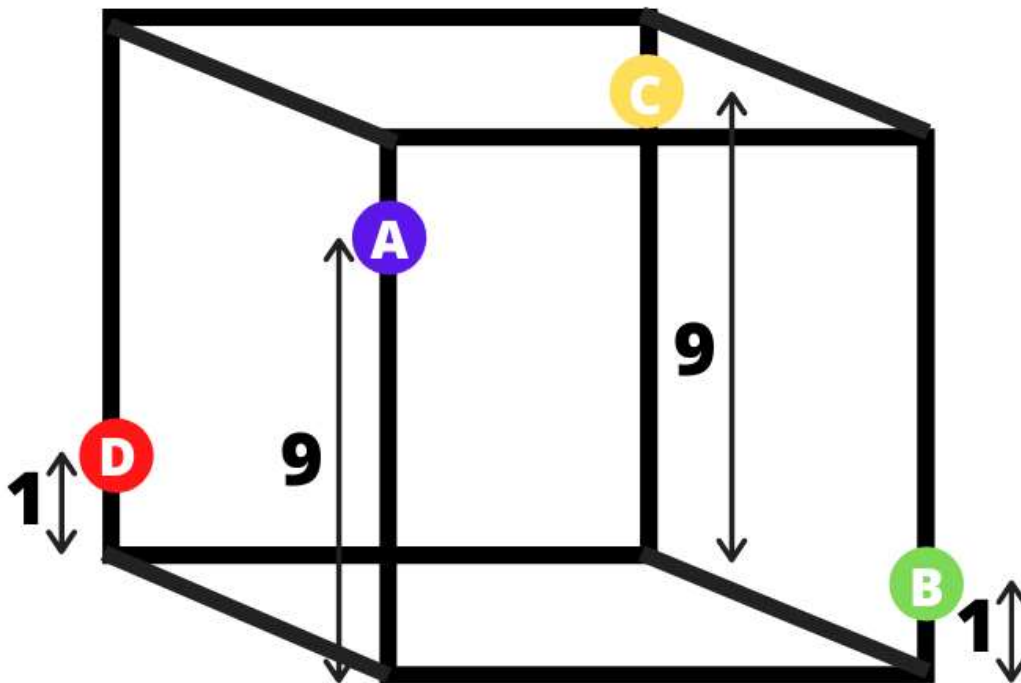
MAXAREA: 52800
MINAREA : 40000

State3



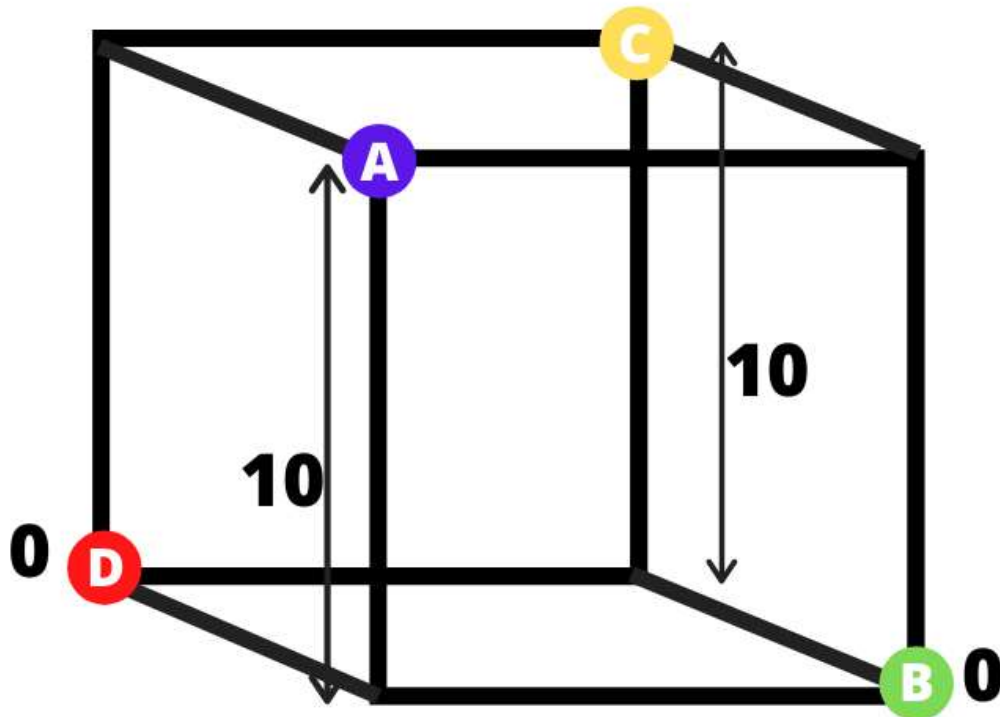
MAXAREA: 68800
MINAREA : 40000

State4



MAXAREA: 91200
MINAREA : 40000

State5



MAXAREA: 120000
MINAREA : 40000

Note: Within a state the area of sum of triangle ABC and triangle ADC is constant. The MAXAREA and MINAREA terms used in the diagrams above are used to keep a track of maximum area and minimum area achieved until that point in time.

$\text{MAXAREA} = [4 * [\text{Max} (\text{sum of area of triangle ABC and area of triangle ADC})]^2]$

$\text{MINAREA} = [4 * [\text{Min} (\text{sum of area of triangle ABC and area of triangle ADC})]^2]$