Q: Differentiate between BigBang and Big Crunch. How age of Universe can be predicted?

# Difference Between Bigbang and Big Crunch

**BigBang**: This theory explains the origin of universe and posits that universe began as an extremely hot, dense singularity. Following the initial explosion of 13.8 billion years ago, the universe has been expanding and cooling ever since.

Add multiple points in differences, preferably in tabular form

**Big Crunch**: This is a hypothetical scenario that explains ultimate fate of universe. This theory posits that if universe is (extrem) dense enough, gravitional forces of attraction among all its components will overcome forces of expansion reversing the bigbang. This would cause contracting of universe, leading to collapse of all matter and energy back to singularity.

## AGE OF UNIVERSE

According to Bigbang, age of universe is 13.8 billion years. However, following are different methods for determining age of universe.

## 1- Hubble's law and Expansion Rate of Universe

By observing the distant galaxies, scientists can measure their red shifts and can determine how fast the universe is expanding. Hubble's constant gives expansion rate of universe. By inverting this rate, scientists can estimate age of universe.

$$t = 1/H_0$$

Current observations have shown $\frac{1}{H_0}$ is between 10 and 20 billion years.

## 2- Age of Oldest Star Clusters

The oldest star clusters contain only those stars which are less massive than 0.7 times the solar mass. These are dimmer than sun and have ages between 11 and 18 billion years. Estimating the age of oldest star clusters gives a lower limit to age of universe. In this way, it helps in determining age of universe.

## 3- Cosmic Microwave Background (CMB) radiation

Cosmic Microwave Background radiation is an afterglow radiation from bigbang. By observing its properties, cosmologists get reflection of universe when it was only 3,80,000 years old. By studying CMB radiation's temperature fluctuations and fitting them into the

model of cosmic evolution, age of universe can be predicted.

2: What are buses in computer. Discuss their types. Draw block diagram of input and output devices.

# Buses In Computer

Buses in computer are communication systems that transfer data between components within a computer or between computers.

Function of Buses:
Buses are used to carry data among all components of computer including CPU, memory and input/output devices.

Examples: Universal serial Bus (USB), Peripheral Component Interconnect (PCI) etc

# Types of Buses

1- **Data Bus**: It is a bidirectional bus that carries data being processed by the computer.

2- **Address Bus**: It is a unidirectional bus that carries address of data (not the data itself) so that CPU knows where to send and retrieve data.

3- **Control Bus**: It is a bidirectional bus that carries signals like read/write signal, interrupt signals, clock signals from CPU to other components.

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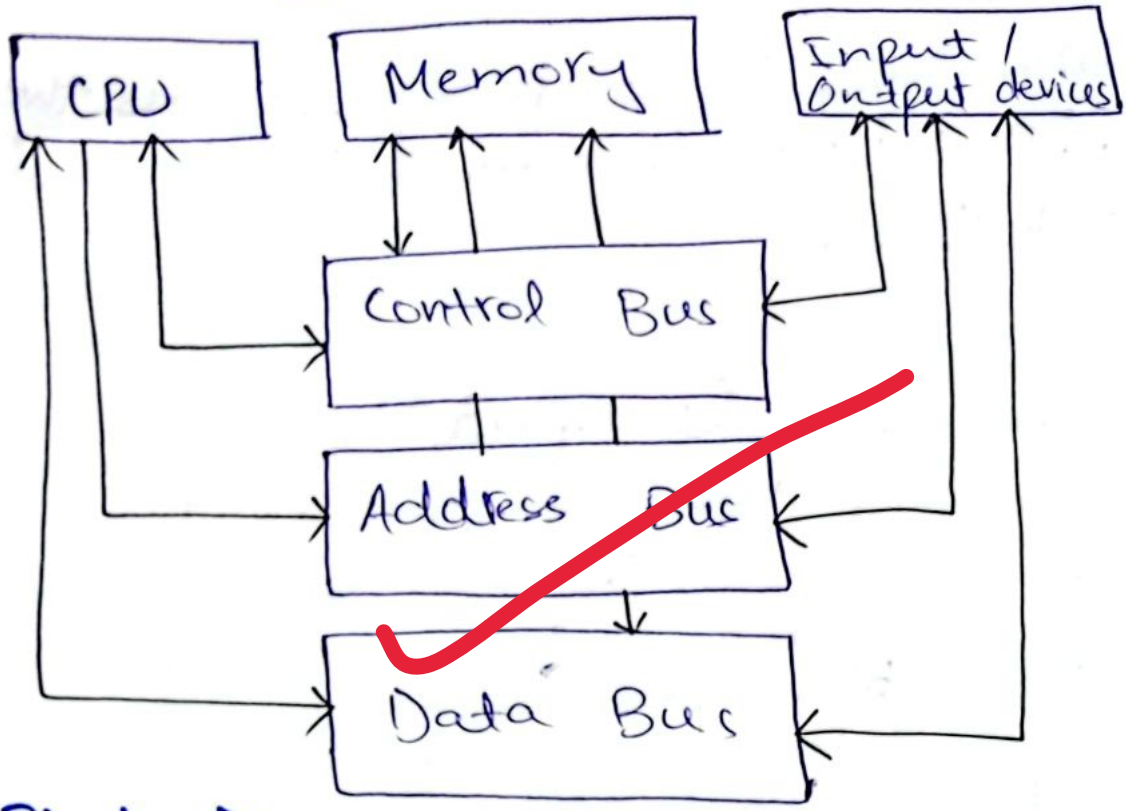
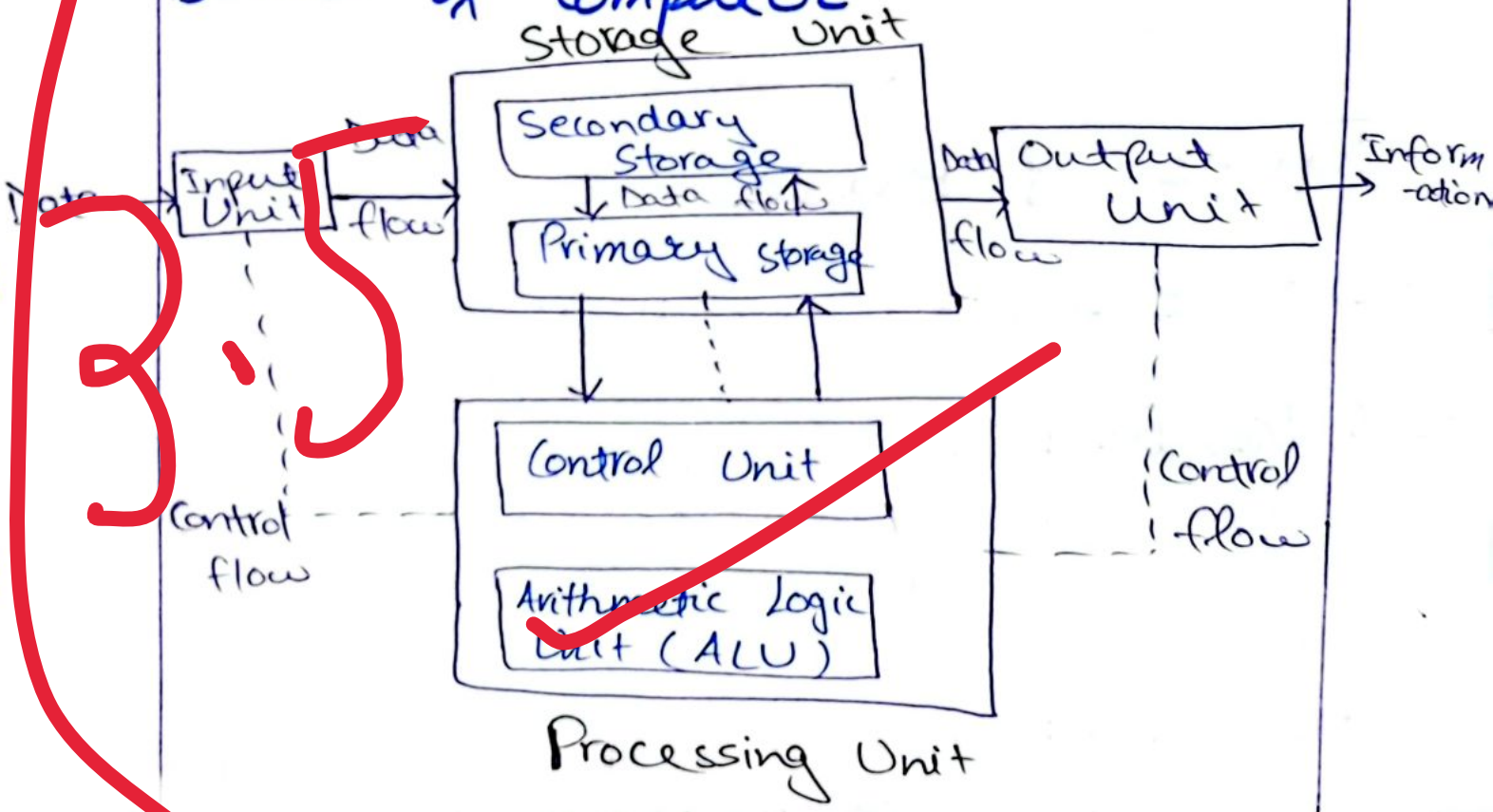
# Block Diagram of System Bus




# Block Diagram of Input and Output Devices of Computer



Q: Write a note on Balanced Diet.

# Balanced Diet

A balanced diet is the one which contains appropriate proportions of food from all five groups of food. This diet is essential for normal growth, development, metabolism and overall health of human body.

## Primary Components of Balanced Diet

1- **Proteins:**

Sources: Milk, meat, fish, eggs, dairy products, beans and pulses etc

Role: Essential for repairing and maintaining all body tissues

2- **Carbohydrates:**

Sources: Wheat, Rice, Oats, Vegetables, fruits etc

Role: Main source of energy production

3- **Vitamins:**

Sources: Citrus fruits, leafy green vegetables, milk, meat, fish, nuts etc

Role: Essential for cellular function, nerve function, immune function and red blood cell formation

Add a bit more detail under each.....

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4. Fats:

Sources: Fatty fish, oil, butter, nuts etc

Role: Essential for absorption of certain vitamins and cellular function

5. Minerals and fibres

Sources: Milk, whole grains, vegetables, fruits, nuts etc

Role: Fibres are Essential for regulating blood sugar levels. Minerals are vital for maintaining bone health.

Water??

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Q: Machine learning is a subset of Artificial Intelligence. How has it revolutionized the today's world.

# Machine learning

definition: Machine learning is a field of Artificial Intelligence that involves development of algorithms and statistical models to enable computers to learn from the data and recognize patterns and improve their performance on tasks based on learning without being explicitly programmed.

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# How Machine Learning has Revolutionized Today's World

i- **Revolution in Healthcare**: Machine learning has revolutionized the field of health care because its algorithms analyze medical images and patient data to assist in diagnosing diseases like cancer.

ii- **Advancement in Financial Institutions**: Machine learning has revolutionized banks as it can detect fraudulent transactions in banks by identifying unusual patterns in real time.

iii- **Advancement in Stock Marketing**: It has revolutionized stock marketing as its predictive analytics help to make accurate predictions in stock market.

iv- **Revolution in Online Retail Markets**: Machine learning has revolutionized online retail markets because it analyzes user data through recommendation systems, based on machine learning, to provide personalized recommendations for services.

v- **Advancement in Transportation**: Machine Learning has advanced transportation system because automati autonomous vehicles and Google Maps use machine learning algorithms.

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Q: Distinguish between RAM and ROM.

## RAM (Random Access Memory)

RAM is a hardware of computer that provides temporary storage of data that is being actively processed by the CPU. RAM facilitates quick read and write operations that support running applications.

Purpose:

RAM is used to store operating system files and running applications.

Volatility:

RAM is volatile memory as it loses stored data when computer is turned off or restarted.

Capacity:

RAM has higher capacity than ROM. Its size ranges from few gigabytes (GB) to several terrabytes (TB)

Speed:

RAM has higher speed than ROM.

Types:

RAM has following types: Dynamic RAM (DRAM) and Static RAM (SRAM).

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# ROM (Read Only Memory)

ROM is the form of memory that is built-in computing devices to provide permanent storage of data that doesnot change. It stores firmware, which is essential for booting up computer and storing basic basic output operations.

Purpose:
ROM is used to store BIOS (Basic Input Output System) and UEFS (Unified Extensible Firmware Interface).

Volatility:
ROM is non-volatile memory that retains data even if computer is turned off.

Capacity:
ROM has less capacity than RAM typically in ranges of few Kilobytes (KB) to several Megabytes (MB).

Speed:
ROM has slower speed than RAM.

Types: ROM has following types.

i) PROM (Programmable ROM)
ii) EPROM (Erasable Programmable ROM)
iii) EEPROM (Electrically Erasable Programmable ROM)

Discuss the differences side by side

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Q: Maximum length and depth of Dal lake in Srinagar is 4.6mile and maximum width is 2.2mile. Find surface area of Dal lake.

135
~~680~~
8

For finding surface area of Dal lake, let's approximate Dal lake as a rectangle. According to given condition

Maximum length = $l$ = 4.6mile

Maximum width = $w$ = 2.2 mile

Surface Area of Rectangular lake = $A = l * w$

$A = (4.6\text{mile}) * (2.2\text{mile})$

Surface Area of Lake: $A = 10.12\ \text{mile}^2$

C- A tablet contains 30 mg of medication. How many tablets will be needed to provide Ms. Smith with 240 mg of medication?

| Tablet | Medication |
|---|---|
| 1 | 30 |
| x | 240 |

Write the statements as well

From above proportion, equation can be written as

$$\frac{x}{1} = \frac{240}{30}$$

$$x = 8$$

Thus, 8 tablets will be needed to provide 240mg of medication.

3

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d. The average of 50 numbers is 20. If two numbers are 37 and 43 are discarded what is the average of remaining numbers?

Average of 50 numbers = A = 20

$$A = \frac{S}{50} \quad \text{---(i)}$$

If two numbers 37 and 43 are discarded

$$\text{Average} = \frac{S-37-43}{48} \quad \text{---(ii)}$$

"S" can be calculated from eq(i)

$$A = \frac{S}{50}$$

Putting value of A

$$20 = \frac{S}{50}$$

Multiply by 50 on both sides.

$$20 * 50 = \frac{S}{50} * 50$$

$$1000 = S$$

Putting value of S in eq(ii)

$$\text{Average} = \frac{1000-37-43}{48} = \frac{920}{48} = \frac{115}{6}$$

Average = 19.167

Write the final answer in the form of statement

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c) A letter is chosen at random from the word "Superintendent". What is the probability that word is vowel?

Total number of letters = 14

Total Possible outcomes = 14

Total number of vowels = 5

Total Number of ways in which the word is vowel = 5

rough
u
e
i
e
e
14

Probability of event that 'Word is Vowel'

$$P(\text{vowel}) = \frac{\text{Total number of ways in which word is vowel}}{\text{Total Possible outcomes}}$$

$$P(\text{vowel}) = \frac{5}{14}$$

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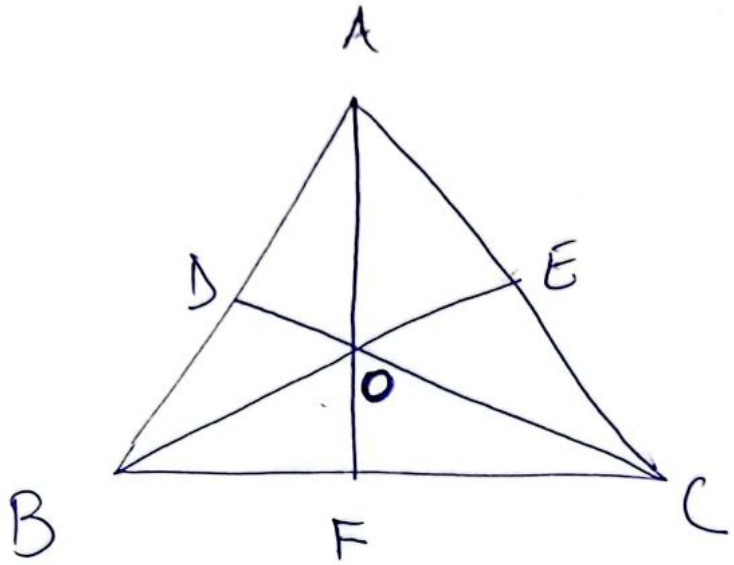
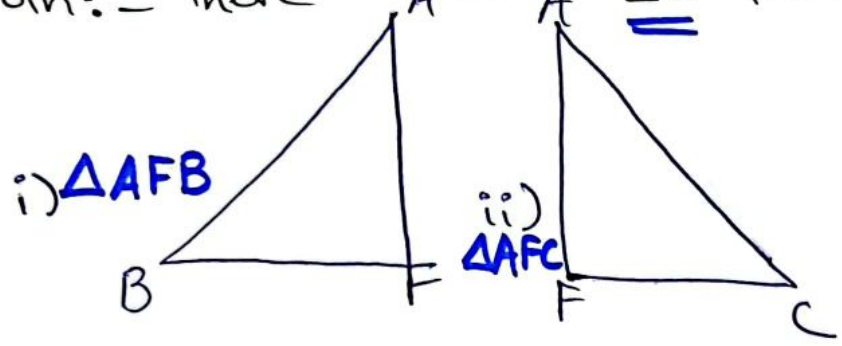
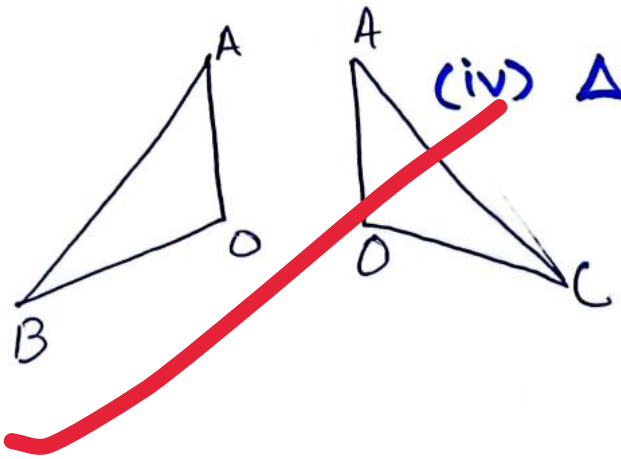



Q:- Find the number of triangles in above equilateral triangle.

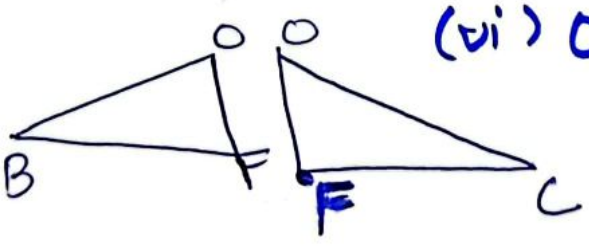
Soln:- There are "15" triangles in above triangle.



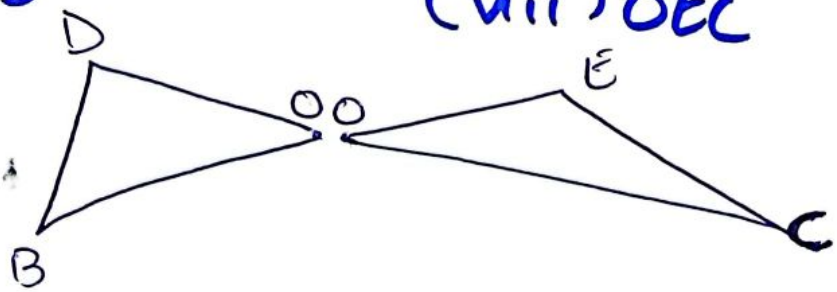

(iii) ΔAOB




(v) ΔOBF

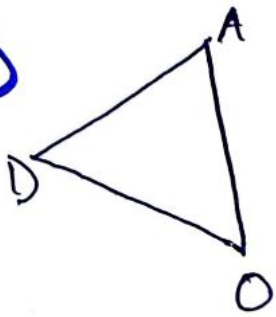


d(vii) ΔODB

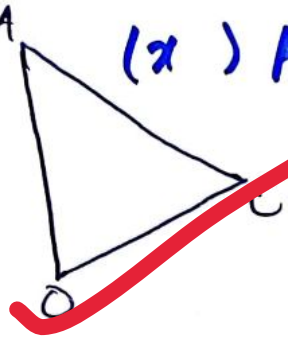



(viii) OEC

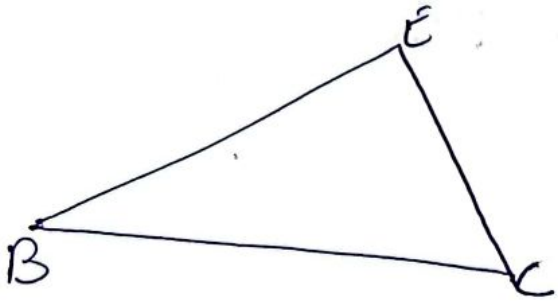
(ix) AOD



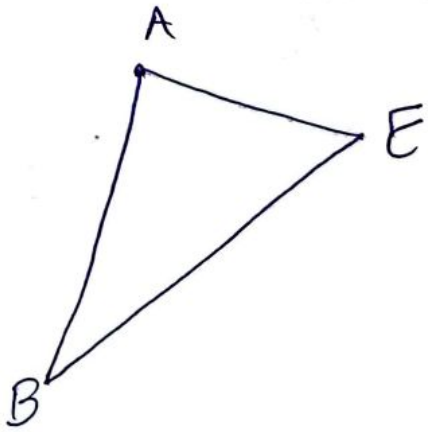

(x) AOE



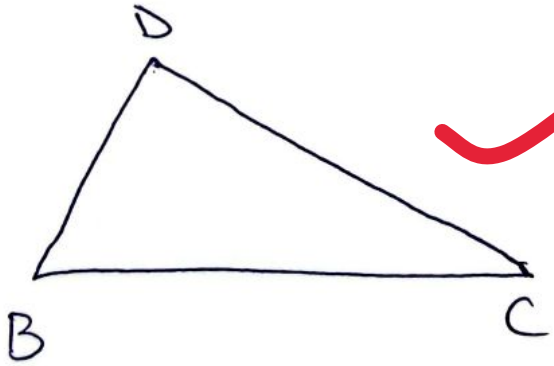

(xi) ΔBEC



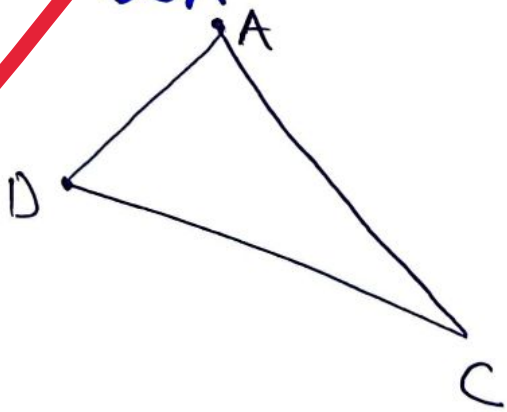

(xii) ΔBEA




(xiii) ΔDCB




(xiv) DCA

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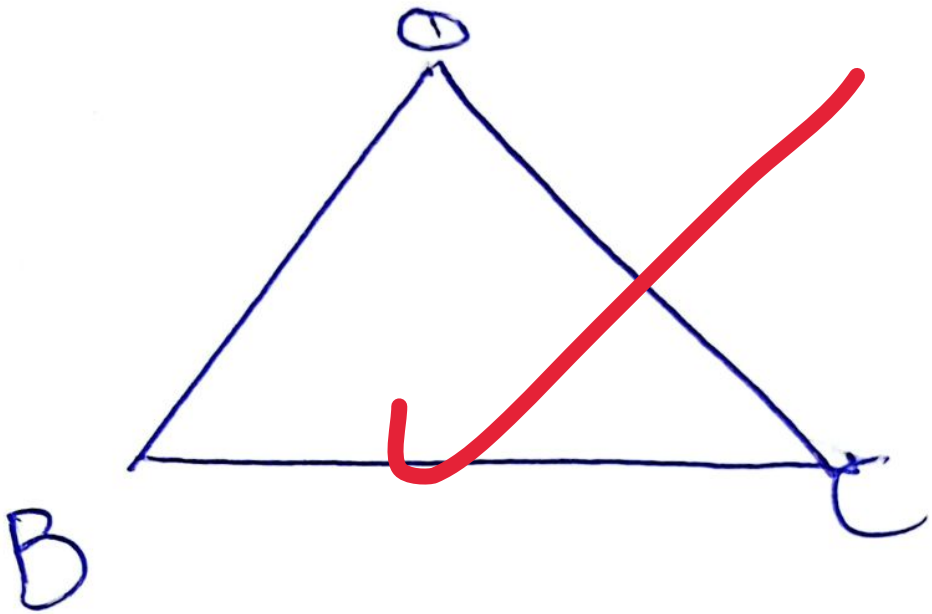
(xv) ΔOBC

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