LAB9:

PRELAB:

1. Implement to unify *p(X,Y,Y)* with *p(a,Z,b)*.

2. Find the MGU of {p(b, X, f(g(Z))) and p(Z, f(Y), f(Y))}

IN LAB:

1. A, B, C, D and E are five thieves living on different floors of a 5 storeyed apartment. They escaped from the police and are hiding in the same building. The police caught them but they don't know which floor they are in. Here are some clues(Problem statements) to find them:

- A does not live on the top floor.
- B does not live on the bottom floor.
- C does not live on either the top or the bottom floor.
- D lives on a higher floor than does B.
- E does not live on a floor adjacent to C.
- C does not live on a floor adjacent to B.

Write a python code to help the policemen to find out where do the thieves live?

OUTPUT:

POSTLAB:

1. Write down the unify function and solve the given example

Suppose you have two expressions p(X) and p(Y). One way to unify these is to substitute any constant expression for X and Y: { fred/X, fred/Y }. But this is not the most general unifier, because if we substitute any variable for X and Y, we get a more general unifier: { Z/X, Z/Y }. The first unifier is a valid unifier, but it would lessen the generality of inferences that we might want to make.

LAB-8

PRELAB:

1. Write a short note on Knowledge Based agent with its architecture and write the two functions of Knowledge Based agent. Write a simple algorithm on its functionality.
2. State and explain about forward chaining with an example.

IN LAB:

1. Write a python code for the following inference rules and facts such that the inference engine generates a list. Implement the code using Forward Chaining.

```
Seed(A) ==> Plant(A).
Plant(A) ==> Fruit(A).
Plant(A),Eating(A) ==> Human(A).
Plant("Mango").
Eating("Mango").
Seed("Sprouts").
```

POST LAB:

1. Translating English into first order logic

    1. Every gal in Constantinople lives in Istanbul, not Constantinople.

    2. Every new beginning comes from some other beginning end.

2.

a) Apply backward chaining and prove that Gita loves Kurtis.
b) Derive forward chaining using the given known facts to prove Tony is blue.

- Tony barks.
- Tony eats bone.

LAB 7

PRE LAB:

1. What are the techniques of Knowledge Representation? Explain in brief about Logical Representationand write the advantages and disadvantages of Logical Representation?

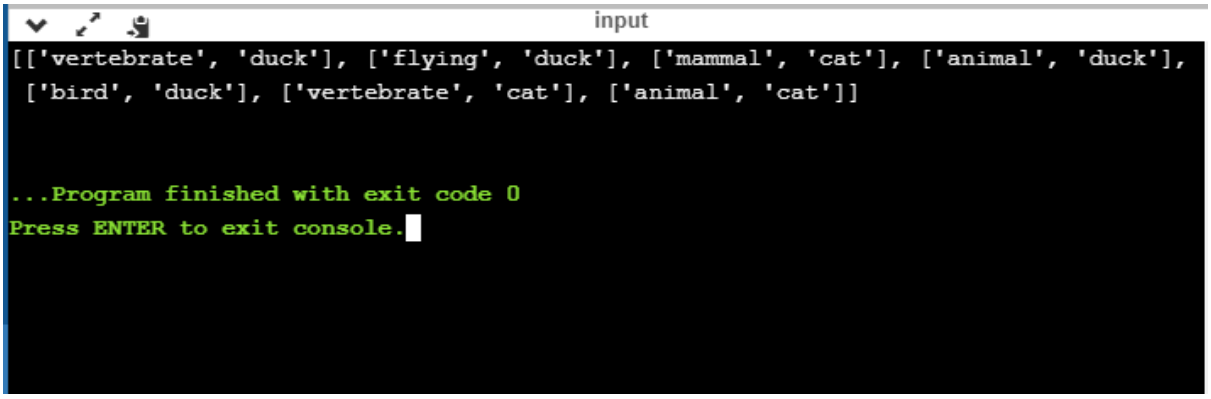
2. List the names of inference rules of Propositional logic and write the properties of the Propositional logic?

IN LAB:

1. Given below is the list of inference rules:

mammal(A) ==> vertebrate(A).
vertebrate(A) ==> animal(A).
vertebrate(A),flying(A) ==> bird(A).
vertebrate("duck").
flying("duck").
mammal("cat").
Translate those rules into a python code.

OUTPUT:



2. Solve the following
Consider the following axioms:
1. Anyone whom Mary loves is a football star.
2. Any student who does not pass does not play.
    1. John is a student.
    2. Any student who does not study does not pass.
    3. Anyone who does not play is not a football star.
    4. (Conclusion) if John does not study, then Mary does not love

John.

POSTLAB:

1. After teacher explained about inference topic in Proportional logic topic, Sita gave these problems to her friend to test her capability. Help her solve the problems.

i. “If I eat spicy foods, then I have strange dreams.” “I have strange dreams if there is thunder while I sleep.” “I did not have strange dreams.”

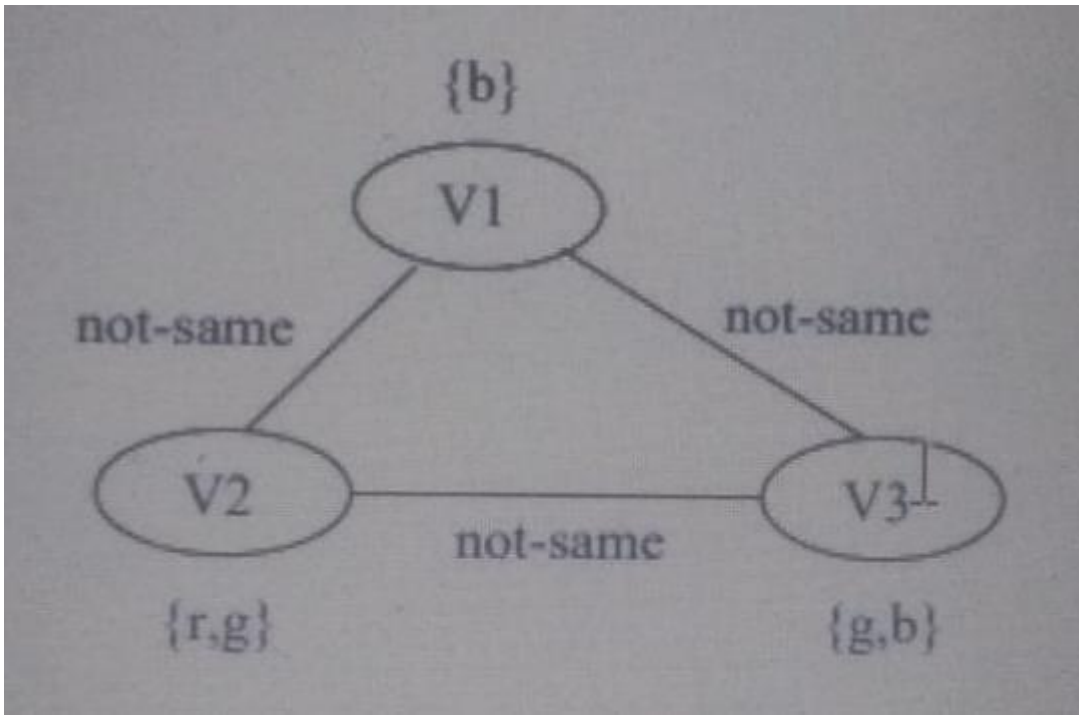
ii. “I am dreaming or hallucinating.” “I am not dreaming.” “If I am hallucinating, I see elephants running down the road.”

LAB-6:

PRELAB:

1. Solve the CSP problem:
TWO+TWO=FOUR

2. Apply ac1 for the following diagram.



INLAB:

1. You have to color a map with different colors where no two neighboring regions can have the same color. Assume that you have 5 colors red, blue, green, yellow and pink.Write an efficient python code to color the regions in the following map.

Sample Output:

```
input
{'Madhya Pradesh': 'Red', 'Andhra Pradesh': 'Red', 'Kerala': 'Red', 'Odisha': 'Blue',
 'Telengana': 'Green', 'TamilNadu': 'Green', 'Chhattisgarh': 'Yellow', 'Maharashtra':
 'Pink', 'Karnataka': 'Blue'}


...Program finished with exit code 0
Press ENTER to exit console.
```

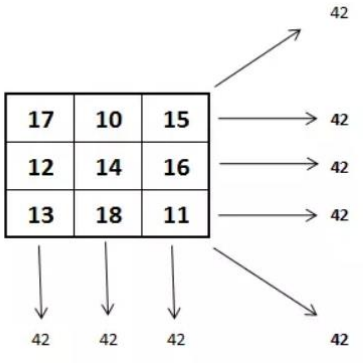
POSTLAB:

1. Solve the following problem using Constraint Satisfaction Problems (CSP):

Test Case 1: Magic Square ([[10,11,12], [13, 14, 15], [16, 17, 18]])
False, this is not a magic square. The numbers in the rows/columns/diagonals do not add up to the same value. Let's try another list of lists.

Test Case 2: Magic Square ([[17,10,15],[12,14,16],[13,18,11]])
True

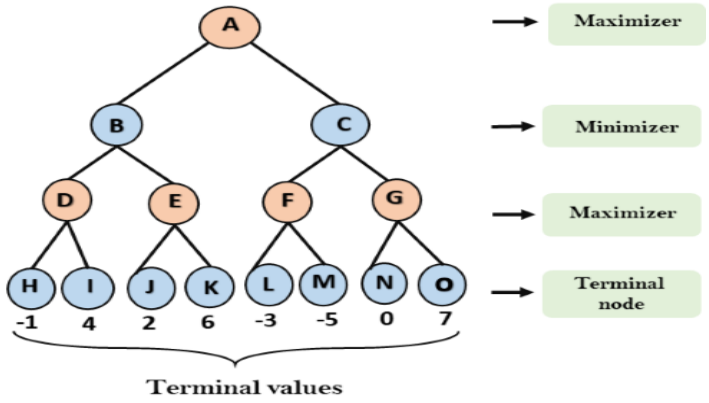
• Develop a python program that satisfies below operations.



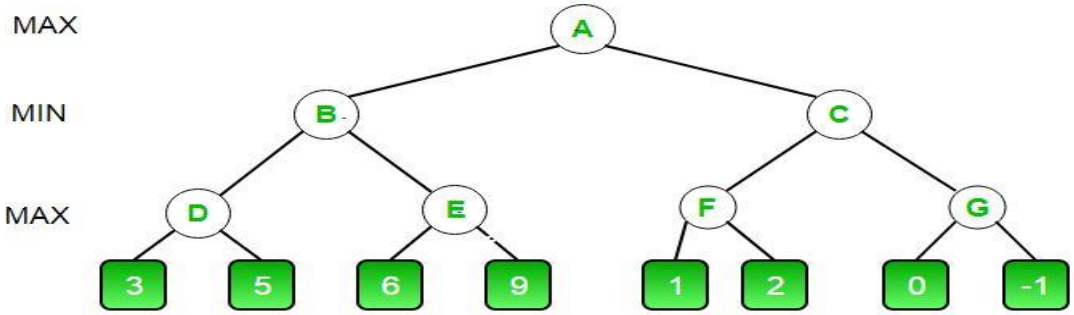
LAB-5:

PRELAB:

1. Write the complete workflow of the minimax two player game.

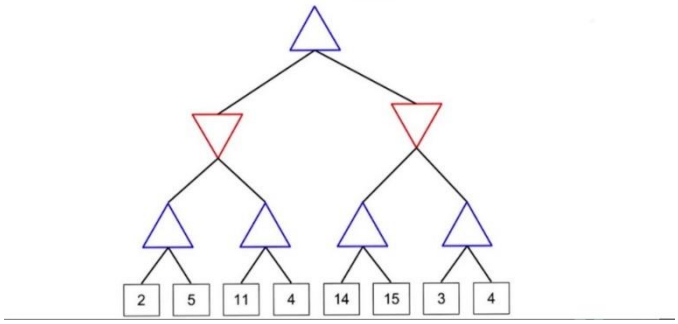


2.Write the complete workflow of the tree using alpha-beta Pruning.



INLAB:

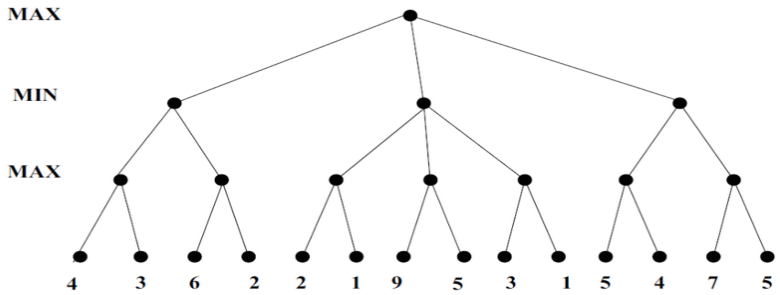
1. Write a python code to print the root node using minimax algorithm.



Output:
The Root Node value is: 5

POSTLAB:

1. Write a python code to implement the given tree and print the alpha - beta values in the root node and also print the result and time pruned by using Alpha beta pruning.



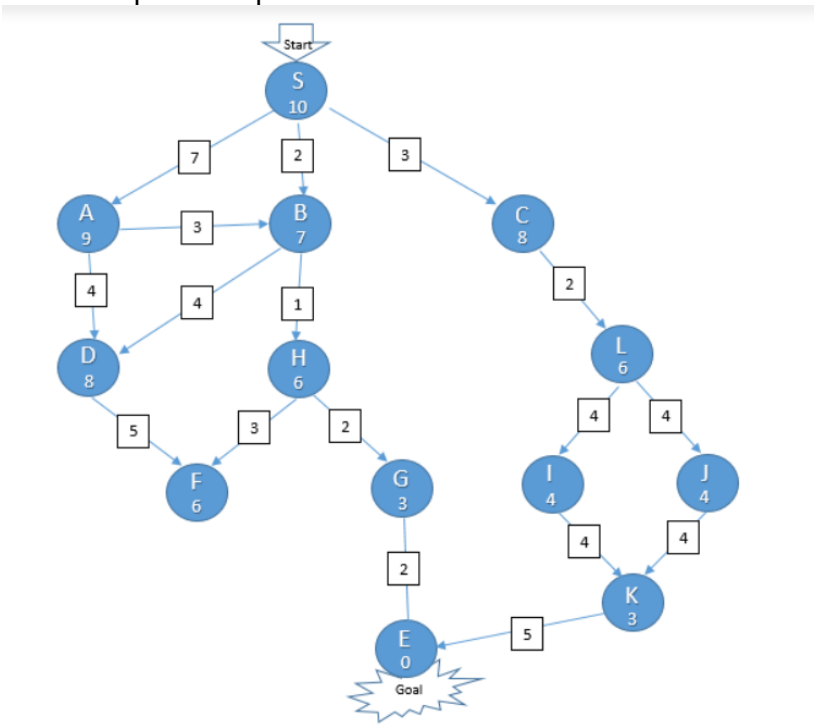
Output:
(Alpha, beta): 5 15
Result: 5
Times pruned: 4

LAB 4:

PRELAB:

1. What are different types of informed searches? Explain about them brief?

2.Differentiate the approach of Greedy BFS and A* BFS on the given tree and compare their time and space complexities.



INLAB:

1. Write a python program to find the path in the following maze using A* algorithm,considering 1 as the wall and 0 as the movable region.

```
maze = [[0, 0, 0, 0, 1, 0, 0, 0, 0, 0],
        [0, 0, 0, 0, 1, 0, 0, 0, 0, 0],
        [0, 0, 0, 0, 1, 0, 0, 0, 0, 0],
        [0, 0, 0, 0, 1, 0, 0, 0, 0, 0],
        [0, 0, 0, 0, 1, 0, 0, 0, 0, 0],
        [0, 0, 0, 0, 0, 0, 0, 0, 0, 0],
        [0, 0, 0, 0, 1, 0, 0, 0, 0, 0],
        [0, 0, 0, 0, 1, 0, 0, 0, 0, 0],
        [0, 0, 0, 0, 1, 0, 0, 0, 0, 0],
        [0, 0, 0, 0, 0, 0, 0, 0, 0, 0]]

start = (0, 0)
end = (7, 6)
```

Output:

```
[(0, 0), (1, 1), (2, 2), (3, 3), (4, 3), (5, 4), (6, 5), (7, 6)]


...Program finished with exit code 0
Press ENTER to exit console.
```

POSTLAB:

1. Write a python program in which the system tries to reach and generate the sentence “Hello, World!”. You have to print the difference of the sentence generated in that step and the actual sentence at each step.

Sample Output:

```
Best score so far 1 Solution Iello, World!
Best score so far 1 Solution Iello, World!
Best score so far 1 Solution Iello, World!
Best score so far 1 Solution Iello, World!
Best score so far 1 Solution Iello, World!
Best score so far 1 Solution Iello, World!
Best score so far 1 Solution Iello, World!
Best score so far 1 Solution Iello, World!
Best score so far 1 Solution Iello, World!
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Best score so far 1 Solution Iello, World!
Best score so far 1 Solution Iello, World!
Best score so far 1 Solution Iello, World!
Best score so far 1 Solution Iello, World!
Best score so far 1 Solution Iello, World!
Best score so far 0 Solution Hello, World!


...Program finished with exit code 0
Press ENTER to exit console.
```
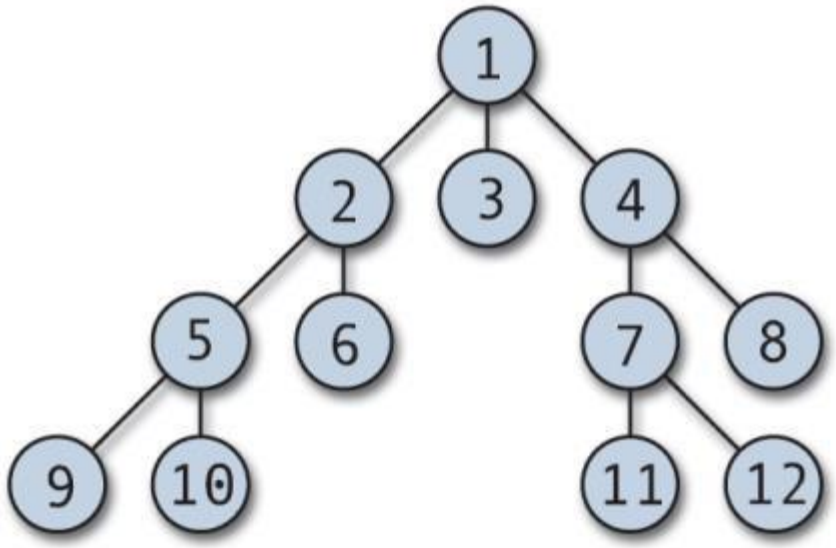

LAB-3

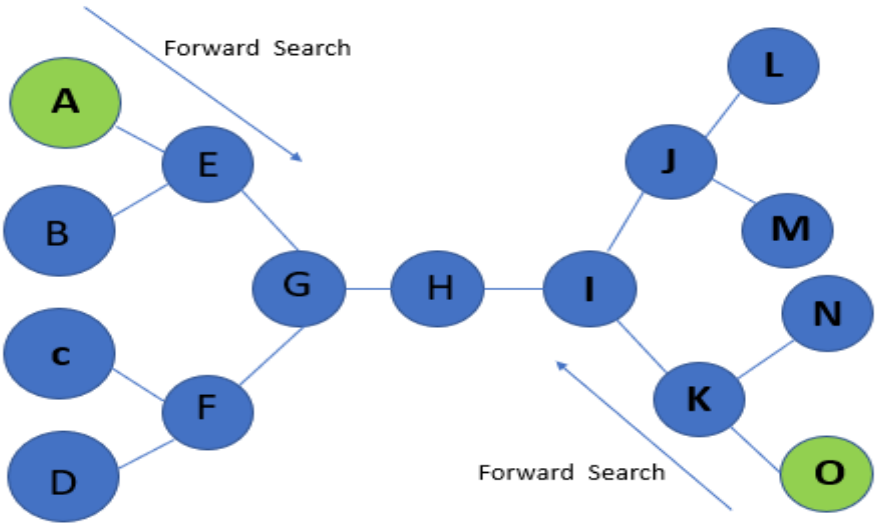
PRELAB:

1. Trace out the path using BFS, DFS and IDDFS for the following tree.



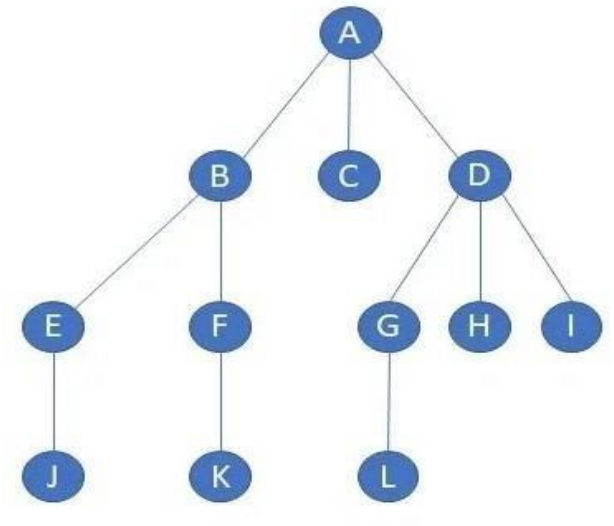
***implement iteration path for each and every level.

2. Trace out the path using Bidirectional search for the following tree with the given starting node and the goal node.



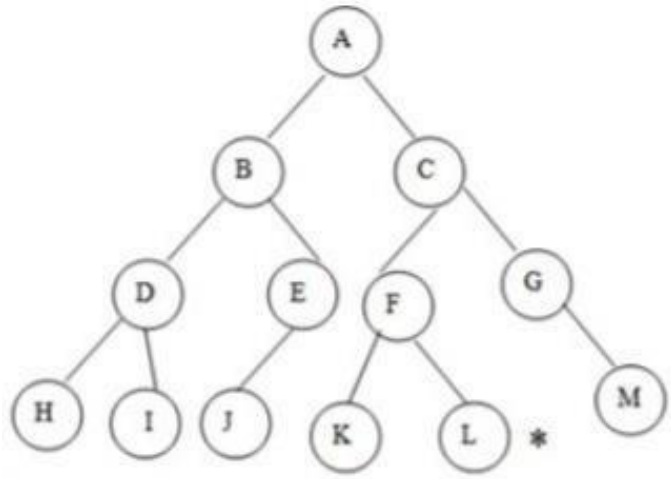
INLAB:

1. Write an efficient python program to implement Breadth-First Search by considering the following tree.



Output:
A B C D E F G H I J K L

2. Write a python code to implement Depth-First Search by considering the following tree. Your code must satisfy the tree to find the best and shortest path.

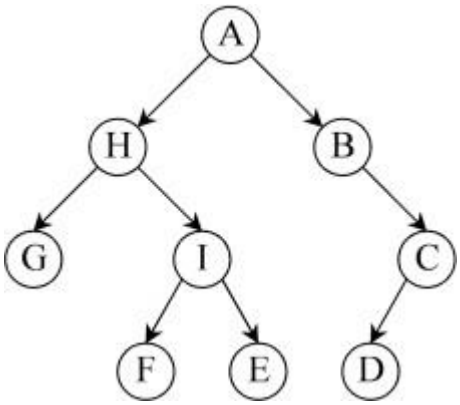


Output:
A
B
D
H
I
J
C

F
K
L
G
M

POSTLAB:

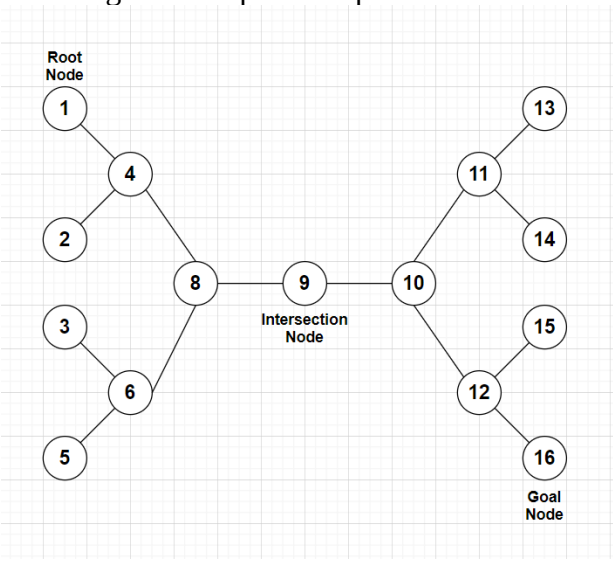
1. Write an efficient python program to implement Iterative deepening search by considering following tree.



Output:

```
Looping at depth  0
a
Result:  None  Goal:  d
Looping at depth  1
a h b
Result:  None  Goal:  d
Looping at depth  2
a h g i b c
Result:  None  Goal:  d
Looping at depth  3
a h g i f e b c d
 --- Found goal, returning ---

Result:  d  Goal:  d
```

2. Write an efficient python program to implement Bidirectional search by considering following tree and print the path.



Output:

[1, 4, 8, 9, 10, 12, 16]

LAB-2

PRELAB:

1. Write an algorithm to solve the water jug problem?

2. You have two jugs with capacities x and y liters. There is an infinite amount of water supply available to you. Now you need to determine whether it is possible to measure z liters using these two jugs. If z liters of water are measurable, you must have z liters contained within one or both jugs by the end.
We can do these few operations −

- Fill any of the jugs fully with water.
- Empty any of the jugs.
- Pour water from one jug into another till the other jug is completely full or the first jug itself is empty.

INLAB:

1. A Water Jug Problem with 2 gallons: You are given two jugs, a 5-gallon one and a 4-gallon one, a pump which can supply unlimited water that can be used to fill the jugs, and a ground on which water can be disposed. Neither jug has any measuring markings on it. Implement a python code to get exactly 2 gallons of water in the 5-gallon jug.

POSTLAB:

1. A Water jug problem with 3 gallon: You are given three jugs, a 12-gallon one and an 8-gallon one and a 5-gallon one, a pump which can supply unlimited water that can be used to fill the jugs, and a ground on which water can be disposed. Neither jug has any measuring markings on it. Implement a python code to get exactly 6 gallons of water in any of the jug.

Lab -1

PRELAB:

1)

1a) Write a python program to check whether the given year is a leap year or not?

1b) Write a python program to print the multiplication table of any number up to 12 steps?

1c) Write a python program to check whether the given number is prime or not?

2. Execute the following string operations by writing an efficient python program by using switch case.

1. Convert the input string into upper case.
2. Convert the input string into lower case.
3. Check whether all the characters of the input string are in upper case.
4. Check whether all the characters of the input string are in lower case.
5. Replace the string "INTELLIgence" by “Neural Network”.
6. Check whether the given string starts with “T”.
7. Check whether the given string ends with “e”.
8. Convert the first letter of the input string into capital letter.
9. Convert the lower-case characters to upper case and vice versa.

INPUT:” aRTificial INTELLIgence”

OUTPUT:

```
Enter a string: aRTificial INTELLIgence
1. convert the input string into upper case.
2. convert the input string into lower case.
3. Check whether all the character of the input string are in upper case.
4. Check whether all the character of the input string are in lower case.
5. Replace the string 'INTELLIgence' by 'Neural Network'.
6. Check whether the given string starts with 'T'.
7. Check whether the given string ends with 'e'.
8. Convert the first letter of the input string into capital letter.
9. Convert the lower-case characters to upper case and vice versa.
10. Exit
--------------------
Choose any option: 1
ARTIFICIAL INTELLIGENCE
```

IN LAB:

1. Riya is a student at K L University, as she is facing some inconvenience in choosing her courses for specialization and its global certifications in CSE Department, help her find a

course and global certification that is required for the specialization she is interested in, by using a simple Chatbot.

CORE COURSE IN 2ND YEAR CSE	SPECALIZATION	GLOBAL CERTIFICATION
Software Engineering	Software Modelling &DevOps	Professional Scrum Master
None	Internet Of Things	None
Operating Systems	Cloud&Edge Computing	Linux Essential(010-160)
Enterprise Programming	Graphics,Gaming&UX Design	Unity Developer Advance Certification
Computer Networks	Cyber Security &Blockchain Technology	ETHEREUM Developer Advance Certification
AI&Mathematical Programming	AI&Intelligence Process Automation	PCAP|CertifiedAssociatePythonProgramming
Data Base Management System	Data Science &Big Data Analytics	C100DEV: MongoDB certified DeveloperAssociate
None	Computer Communications	None

Sample Data:

```
Hi I am student advisor chat Bot.
May I know your name?
Monty
Thank You! Monty
I am here to explore you about the core courses required for the specialization's offered in K L University. CSE Department
Here are the specialization's offered by K L University CSE Department:
1. Software Modelling & DevOps
2. Internet of Things
3. Cloud & Edge Computing
4. Graphics, Gaming & UX Design
5. Cyber Security & Blockchain Technology
6. Artificial Intelligence & Intelligence Process Automation
7. Data Science & Big Data Analytics
8. Computer Communications
9. Exit
These are the specialization's offered by KL CSE.Choose any specialization.(select any option)
---------------------------------------
Choose any option: 6
{'Global Certification': 'PCAP|Certified associate in Python Programming certiification', 'Core Course in  1st sem': 'Artificial
 Intelligence and Mathematical Programming'}
```

POST LAB:

1. Monty is a student. He wants to know his age in years, days, hours, minutes and seconds from his birthdate till date and print a few lines about his favorite color. Create a Chatbot to solve Monty's Problem.

Output:

```
Hello I am chatty
What is your good name? Monty
How are you Monty? fine

Do you want know your age in years,days,hours,minutes,sec you live till now? yes
Enter the date you born:10
Enter the month you born:10
Enter the year you born:2000
19 years
7209 days
173016 hours
10380960 minutes
622857600 seconds
Can I know your favourite color blue
Blue is the color of the sky and sea. It is often associated with depth and stability.
It's time to say bye
I hope you enjoy well
```

2. MIN AND MAX

You are given a 2-D array with dimensions X.

Your task is to perform the *min* function over axis and then find the *max* of that.

Input Format

The first line of input contains the space separated values of and.

The next line contains space separated integers.

Output Format

Compute the *min* along axis and then print the *max* of that result.

Sample Input:

4 2
2 5
3 7
1 3
4 0

Sample Output:

3