SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

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Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A' Grade
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-IOT Including CS&BCT

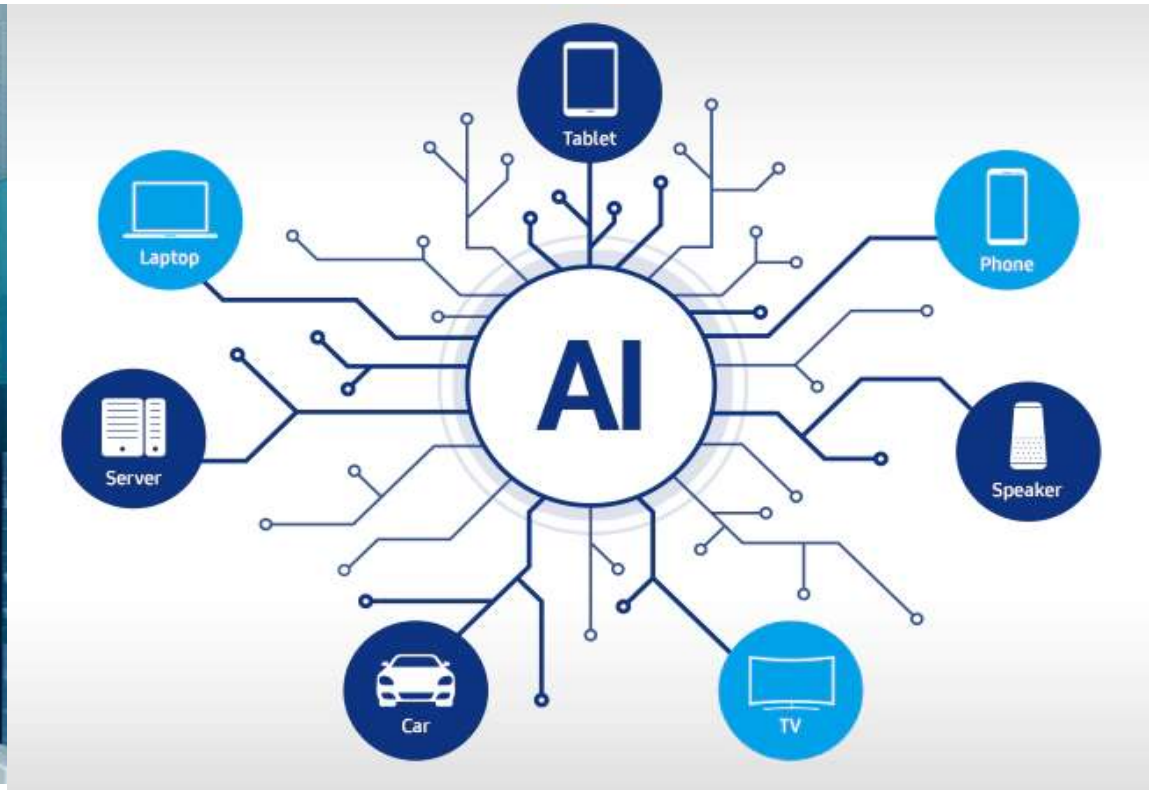
COURSE NAME :**19SB601 ARTIFICIAL INTELLIGENCE AND NATURAL LANGUAGE PROCESSING**

III YEAR / VI SEMESTER

Unit I-**INTRODUCTION TO ARTIFICIAL INTELLIGENCE& INTELLIGENT SYSTEMS**

Topic : INFORMED STRATEGIES

ARTIFICIAL INTELLIGENT



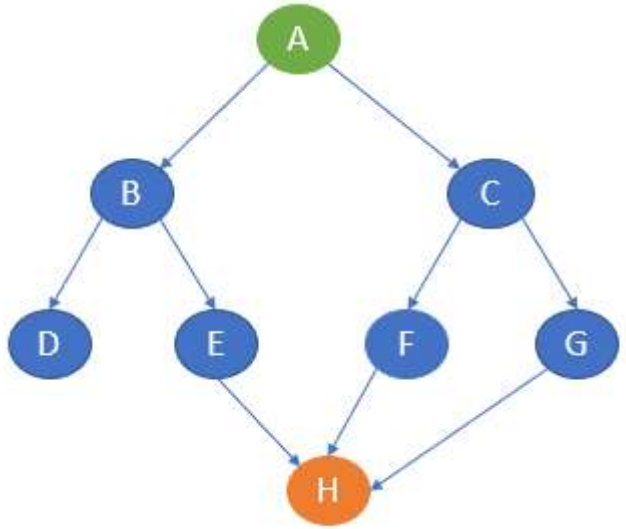
Informed Search Algorithms

- The informed search algorithm is also called heuristic search or directed search.
- In contrast to uninformed search algorithms, informed search algorithms require details such as **distance to reach the goal, steps to reach the goal, cost of the paths which makes this algorithm more efficient.**
- The goal state can be achieved by using the heuristic function.
- The heuristic function is used to achieve the goal state with the lowest cost possible.
- This function estimates how close a state is to the goal.

Greedy best-first search algorithm

- Greedy best-first search uses the properties of both depth-first search and breadth-first search.
- Greedy best-first search traverses the node by selecting the path which appears best at the moment.
- The closest path is selected by using the heuristic function.
- Consider the below graph with the heuristic values.

Greedy best-first search algorithm

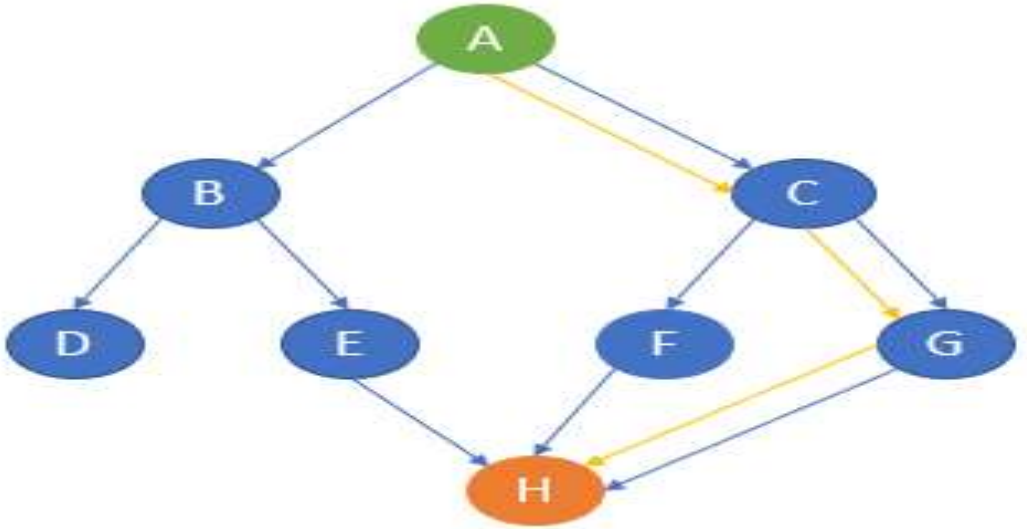


NODES	HEURISTICS
A	13
B	12
C	4
D	7
E	3
F	8
G	2
H	0

Greedy best-first search algorithm

- Here, A is the start node and H is the goal node.
- Greedy best-first search first starts with A and then examines the next neighbour B and C.
- Here, the heuristics of B is 12 and C is 4.
- The best path at the moment is C and hence it goes to C.
- From C, it explores the neighbours F and G.
- the heuristics of F is 8 and G is 2. Hence it goes to G.
- From G, it goes to H whose heuristic is 0 which is also our goal state.

Greedy best-first search algorithm



The path of traversal is
A —-> C —-> G —-> H

Greedy best-first search algorithm

Let’s try this with Python.

```
graph = {
'A':[('B',12), ('C',4)],
'B':[('D',7), ('E',3)],
'C':[('F',8), ('G',2)],
'D':[],
'E':[('H',0)],
'F':[('H',0)],
'G':[('H',0)]
}
```

Greedy best-first search algorithm

```
def bfs(start, target, graph, queue=[], visited=[]):
    if start not in visited:
        print(start)
        visited.append(start)
    queue=queue+[x for x in graph[start] if x[0][0] not in visited]
    queue.sort(key=lambda x:x[1])
    if queue[0][0]==target:
        print(queue[0][0])
    else:
        processing=queue[0]
        queue.remove(processing)
        bfs(processing[0], target, graph, queue, visited)
bfs('A', 'H', graph)
```

The time complexity of Greedy best-first search is $O(b^m)$ in worst cases.

Greedy best-first search algorithm

Advantages of Greedy best-first search

- Greedy best-first search is more efficient compared with breadth-first search and depth-first search.

Disadvantages of Greedy best-first search

- In the worst-case scenario, the greedy best-first search algorithm may behave like an unguided DFS.
- There are some possibilities for greedy best-first to get trapped in an infinite loop.
- The algorithm is not an optimal one.

Any Query????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Thank you……