Solution: 5.

	AS	ANS
PS	99	1
PNS	520	8192.

TP = 99, FP = 1, TN = 8192, FN = 520.

1) Precision = $TP/(TP+FP) = \frac{99}{99+1} = \frac{99}{100} = 0.99.$

2) Recall = $TP/(TP+FN) = \frac{99}{(99+520)} = \frac{99}{619} = 0.159.$

3) Accuracy = $\frac{(TP+TN)}{(TP+TN+FP+FN)} = \frac{99+8192}{99+1+520+8192} = \frac{8291}{8812}$

$= 0.94.$

4). The high precision value indicate that when model predict spam, it is 99% of the time. The recall value would be lower due to the relative high number of false negatives. This means model is not capturing all the spam ~~ts~~ instances.

The model has high precision but lower recall value. meaning model predicts good results but might log behind due to high False Negative.

Solution 2:-

1. There is one and only one monarch:

$\exists x \, (monarch(x) \wedge \forall y \, (monarch(y) \rightarrow x = y))$.

2. A Roman Catholic may not be the monarch:

$\forall x \, (Cathalic(x) \rightarrow \neg Monarch(x))$.

3. The eldest child has the oldest age among one's male children:

$\forall x \forall y \, (Child(y, x) \wedge male(y) \wedge \forall z \, (child(z, x) \wedge male(z) \wedge y \neq z \rightarrow Age(y) \geq Age(z)))$.

4. If the monarch has male child, the eldest male child will be their heir:

$\forall x \, (monarch(x) \wedge \exists y \, (child(y, x) \wedge male(y) \rightarrow Heir(x, Eldest\ male\ child(x, y))))$.

5. If there are no male children, the eldest female child will be the heir:

$\forall x \, (monarch(x) \wedge \neg \exists y \, (child(y, x) \wedge male(y)) \wedge \exists z \, (child(z, x) \wedge Female(z)) \rightarrow Heir(x, Eldest\ female\ child(x, z)))$.

Solution 4:.

Given $\alpha = A \vee B$

$KB = \{A \vee C \vee D, A \vee \neg C \vee D\}$.

To prove $KB \models \alpha$.

1. Resolve on A in $A \vee C \vee D$ and $A \vee \neg C \vee D$

$R_1 = (C \vee D) \vee (\neg C \vee D)$.

2. Resolve on C in R_1 and D in R_1

$R_2 = D$. as we resolve on C, eliminate the first disjunction $(C \vee D)$ because it contains C.

Now R_2 doesn't contain α (B is not present)

Therefore $KB \nvdash \alpha$, we couldn't derive α from KB.

Sallution1:.

Breadth First Search:.

Step	Node Visited	Node in fringe.
1.	S	B, A
2.	B	A, F, E
3.	A	F, E, D
4.	F	E, D, C.
5.	E	D, C, G
6.	D	C
7.	C	G
8.	G.	Final solution.

Solution I:

Depth First Search.

Step	Node Visited	Nodes in Fringe
1.	S	B, A
2.	B	F, E
3.	F	E
4.	E	D.
5.	D	C
6.	C	B
7.	B	A
8.	A	Final Solution.

Solution 1:.

Uniform Cost Search.

Step	Node visited	Nodes in the fringe.
1.	S	B, A
2.	B	A, F
3.	A	F, E, D
4.	F	E, D
5.	E	D, C
6.	D	C
7.	C	G
8.	G	Final. Solution

Solution 1:.

Greedy Best First Search.

Steps	Node Visited	Nodes in fringe.
1.	S	A, B
2.	A	B, F
3.	B	F, E
4.	F	E
5.	E	D
6.	D	C
7.	C	G
8	G.	Final Solution.

Solution 4:.

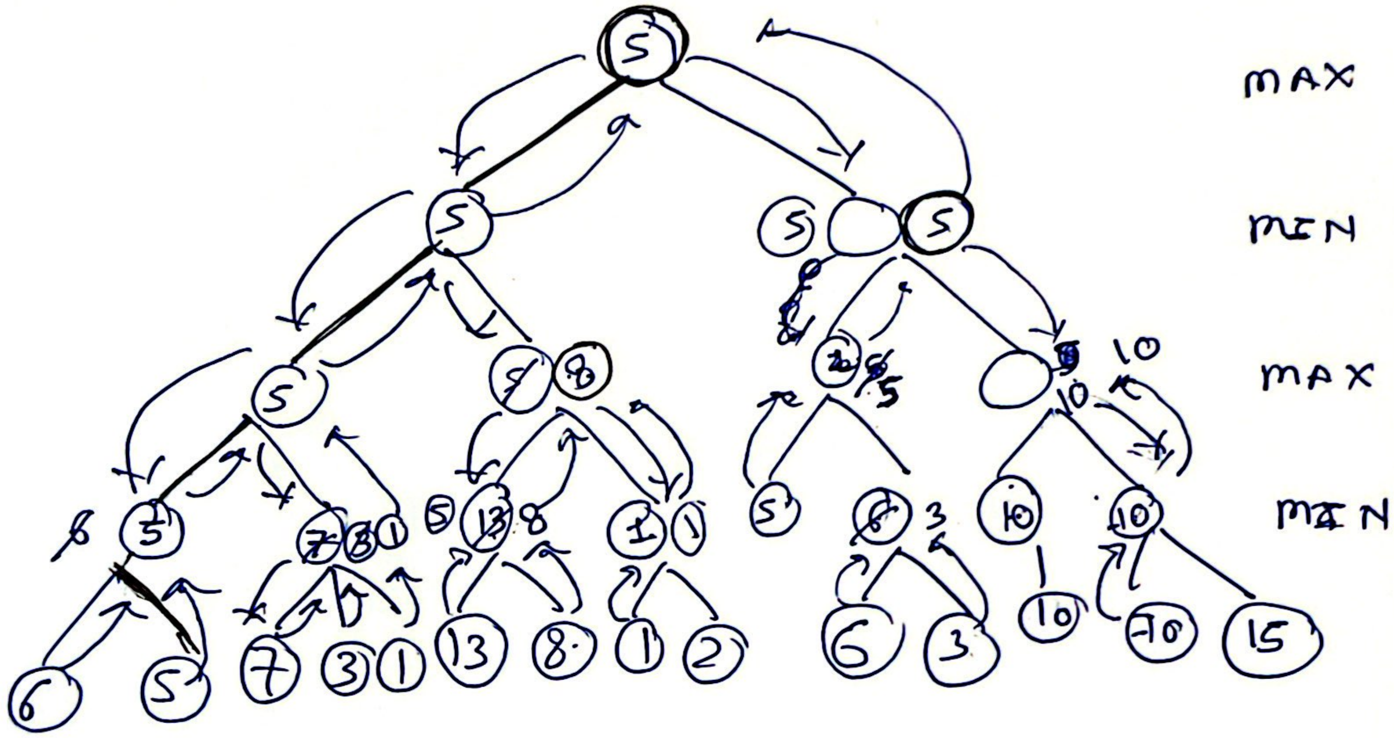
A* Search.

Step	Node Visited	Nodes in fringe.
1.	S	A, B
2.	A	F, E
3.	F	D
4.	D	C
5	C	G.
6.	G	Final Result.

Justification:- The A* algorithm never over estimates the cost of reaching the end goal/node. This ensures A* will always find the optimal solution if one exists. In above example, $S \rightarrow A \rightarrow F \rightarrow D \rightarrow C \rightarrow G$, since it is the shortest path from startnode to end node.

Solution3

MINIMAX

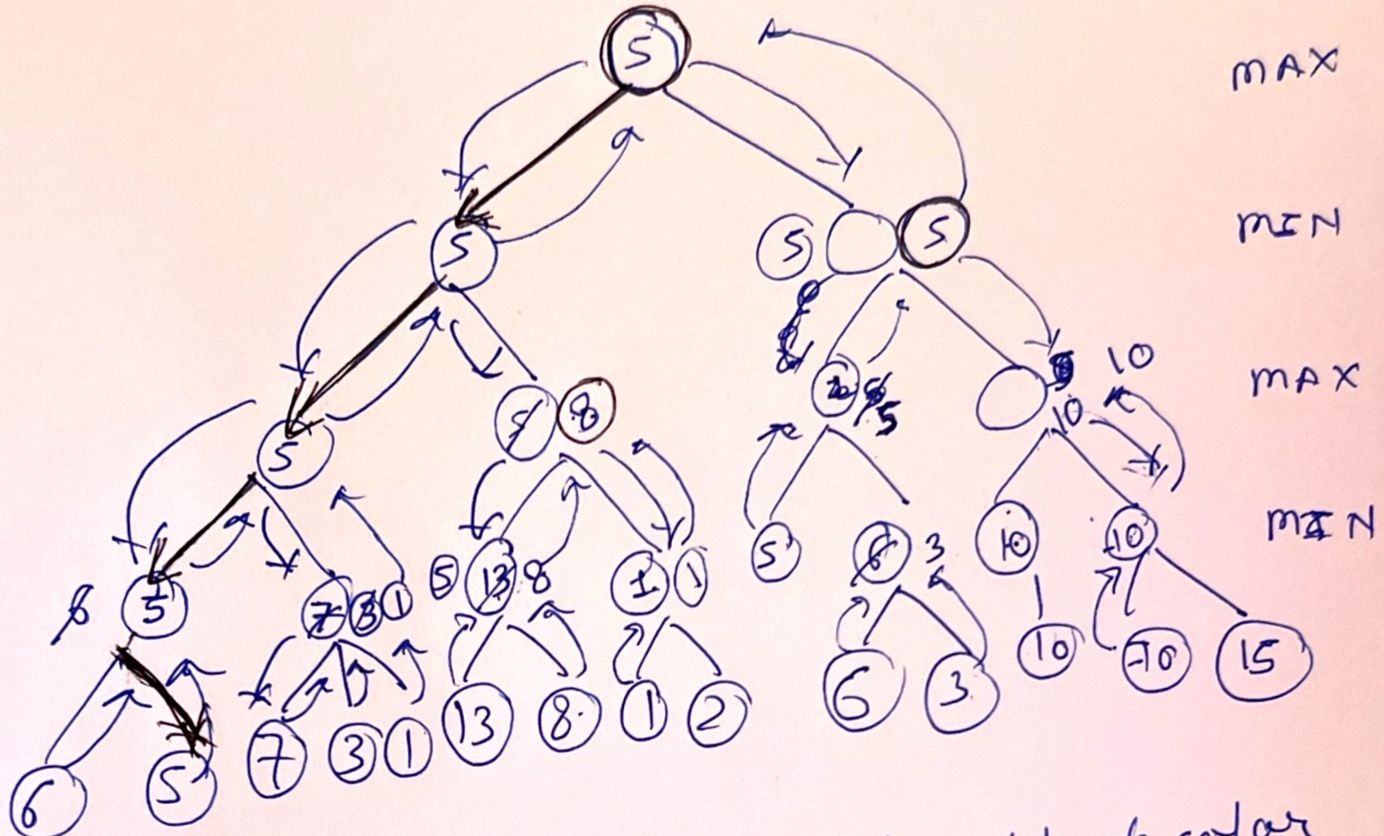


The best path is highlighted in black color ink. Changed values are cut and replaced with new values based on MAX and MIN player.

Scanned with CamScanner

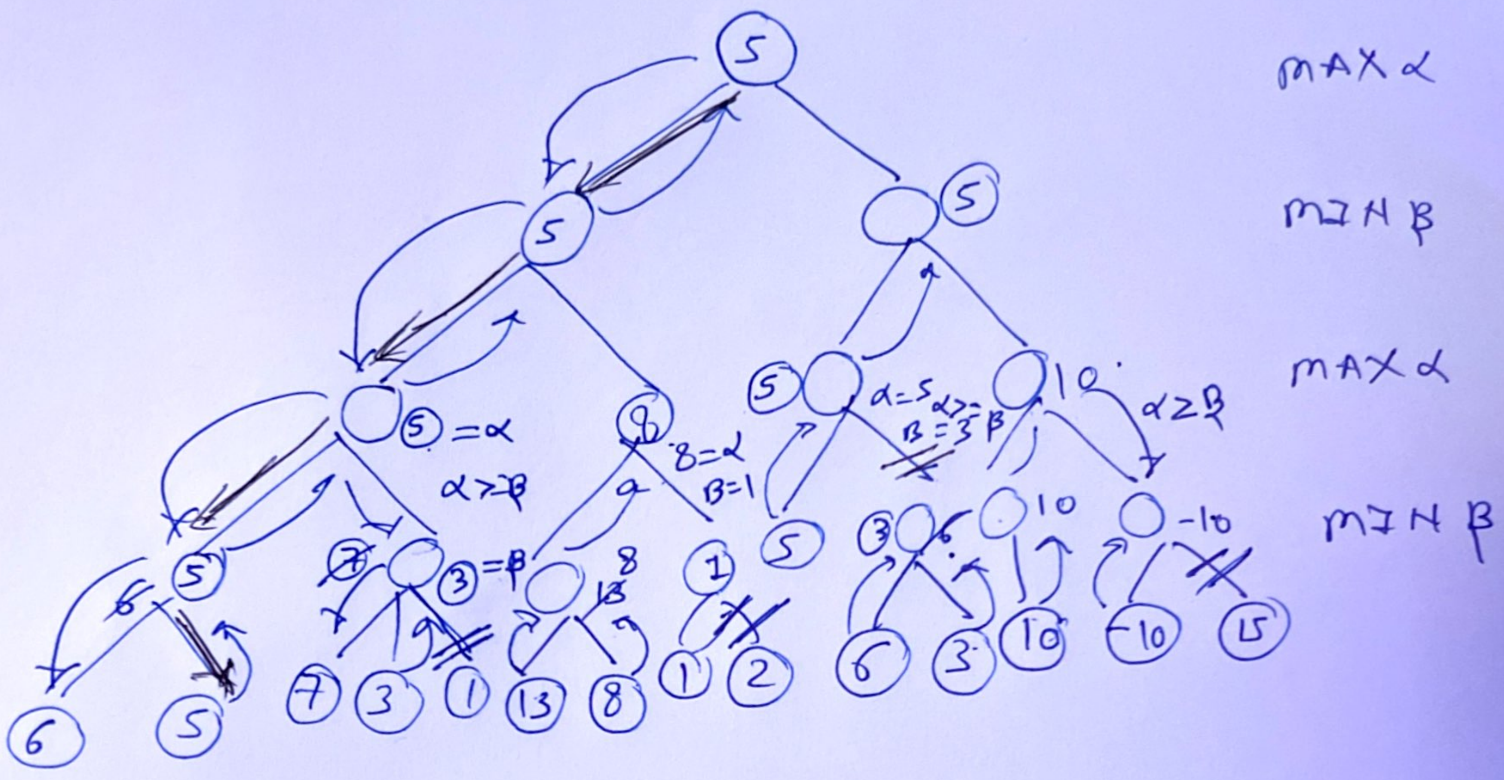
Solution3

MINIMAX



The best path is highlighted in black color ink. Changed values are cut and replaced with new values based on MAX and MIN player.

Solution 3: α, β Pruning.



Pruning condition $\alpha \geq \beta$.

Pruned Branches are denoted by //