ALPHA - BETA PRUNING

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ALPHA - BETA PRUNING

Before

After

Alpha - Beta Pruning

- Avoid processing those sub-trees that have *no effect* on the result.

- Two new parameters

  ➢ α:The best value for MAX seen so far

  ➢ β:The best value for MIN seen so far

Alpha - Beta Pruning

- α is used in MIN nodes, and is assigned in MAX nodes.

- β is used in MAX nodes, and is assigned in MIN nodes.

- **When maximizing:**

  ➢ cut off values lower than Alpha

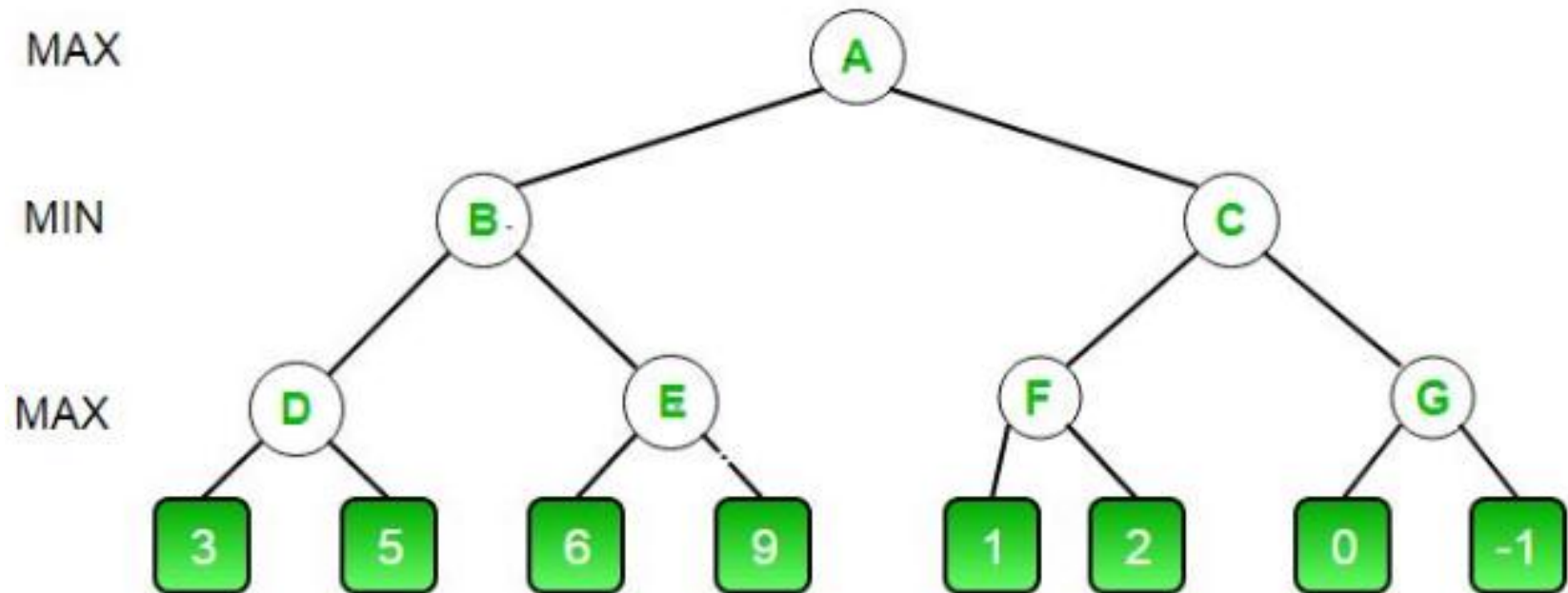- **When minimizing:**

  ➢ cut off values greater than Beta

When to Prune

- *Prune whenever α≥ β*

- Prune below a Max node whose alpha value becomes >= the beta value of its ancestors.

  ➤ *Max nodes update alpha based on children's returned values.*

- Prune below a Min node whose beta value becomes <= the alpha value of its ancestors.

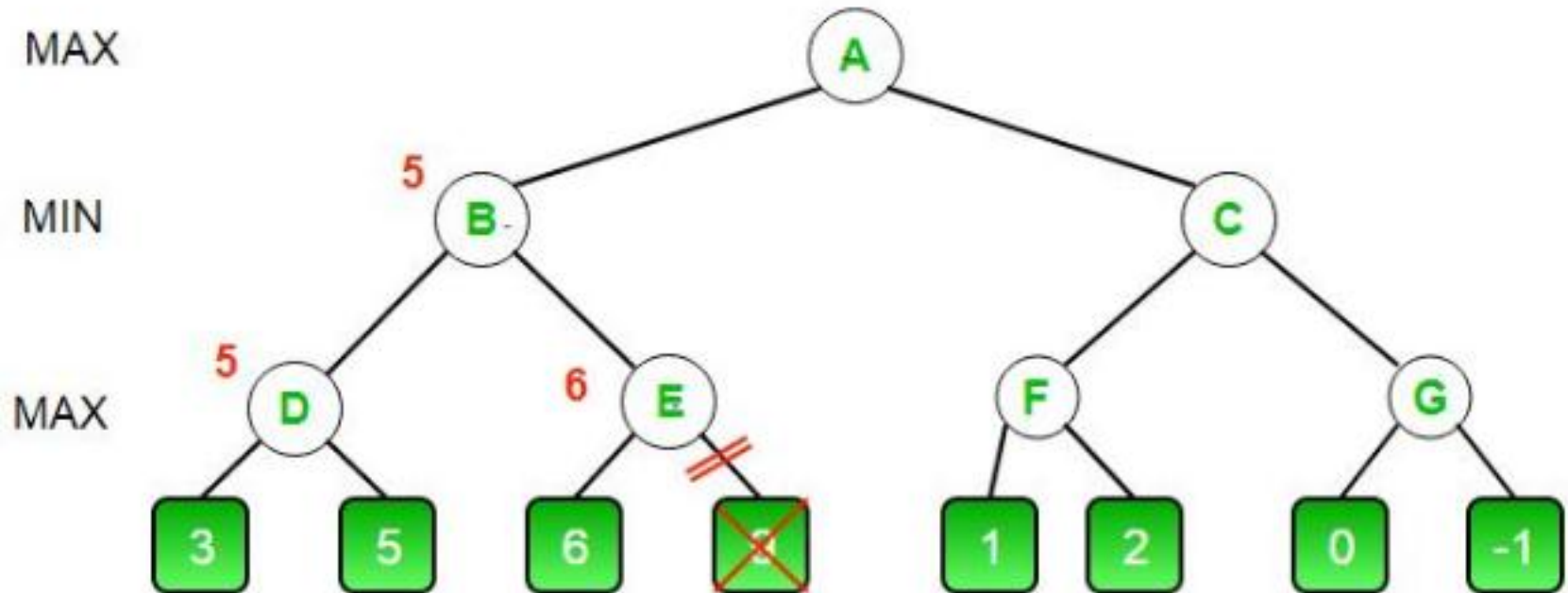 ➤ *Min nodes update beta based on children's returned values.*
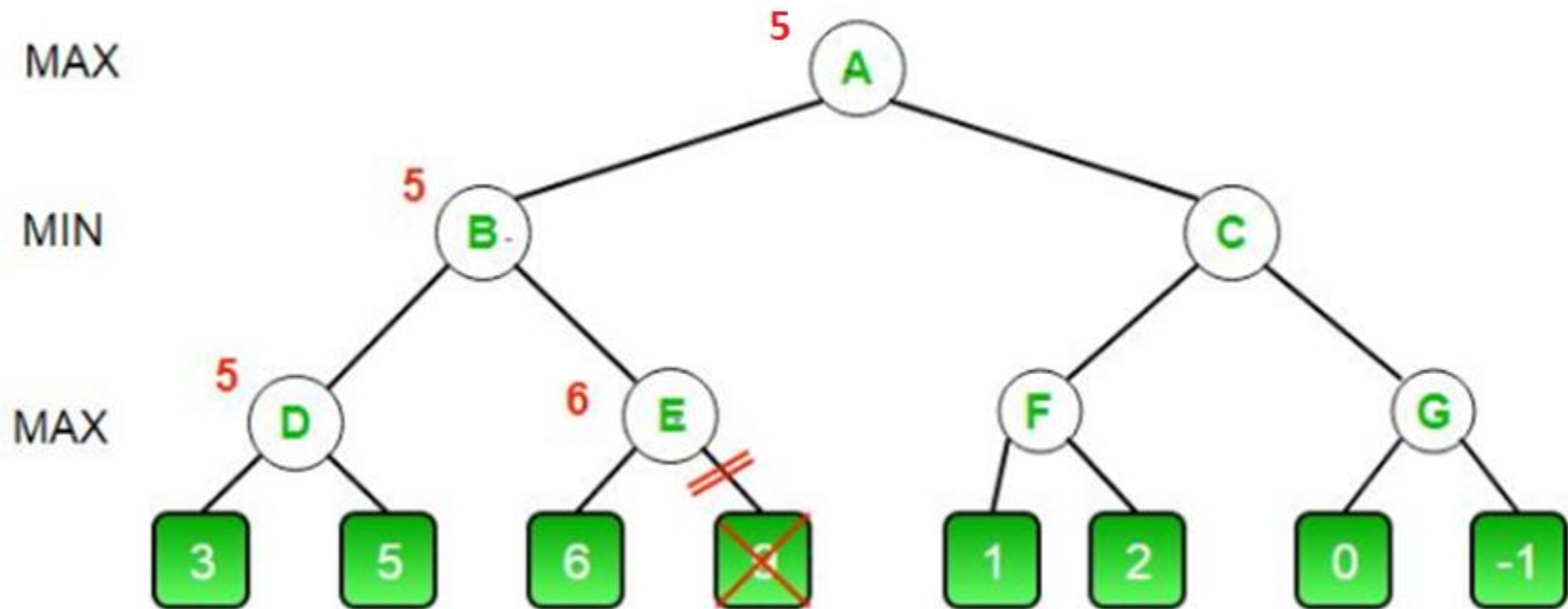
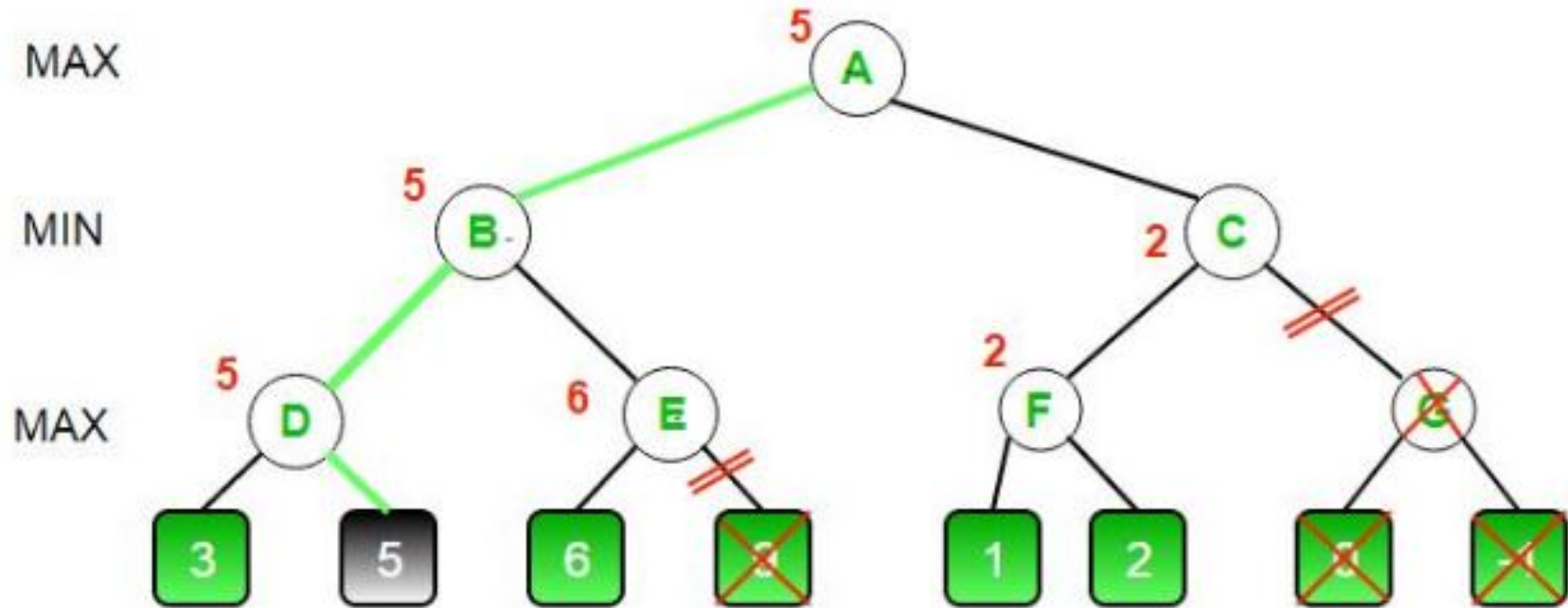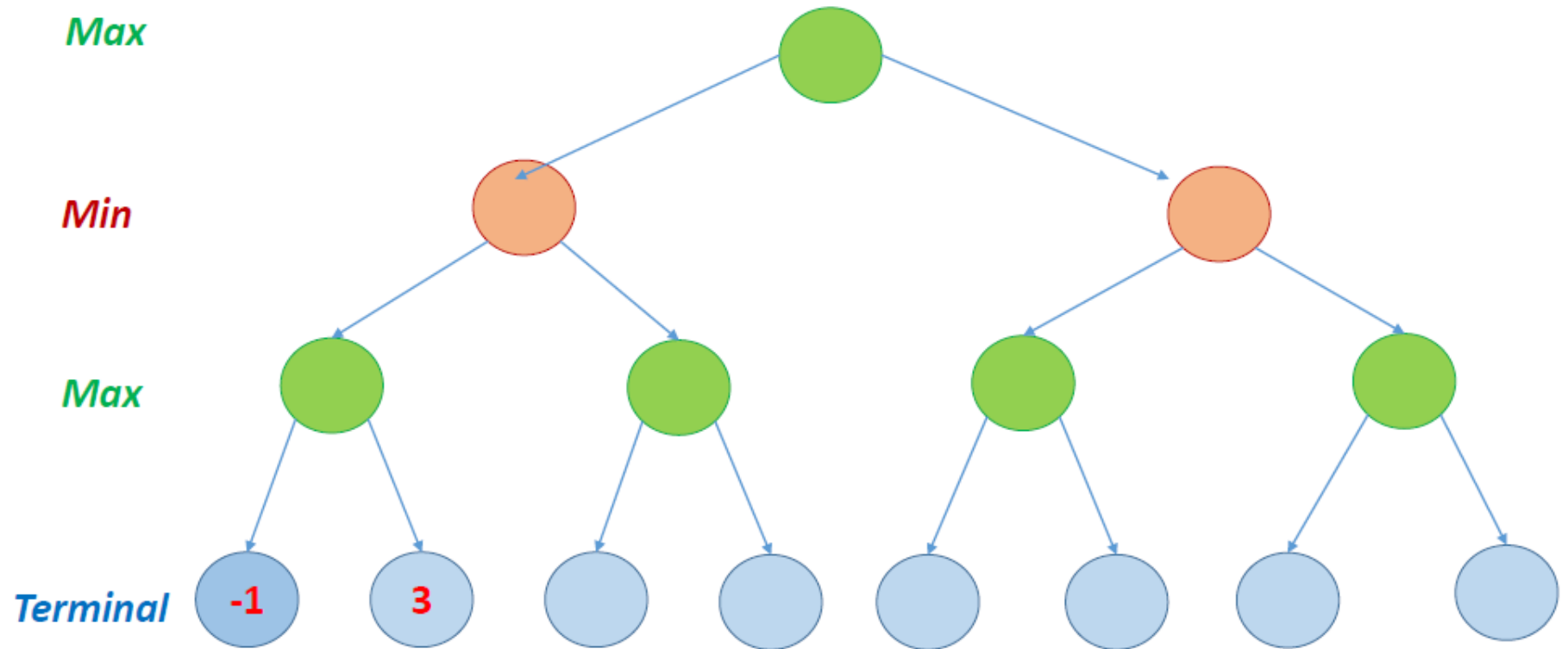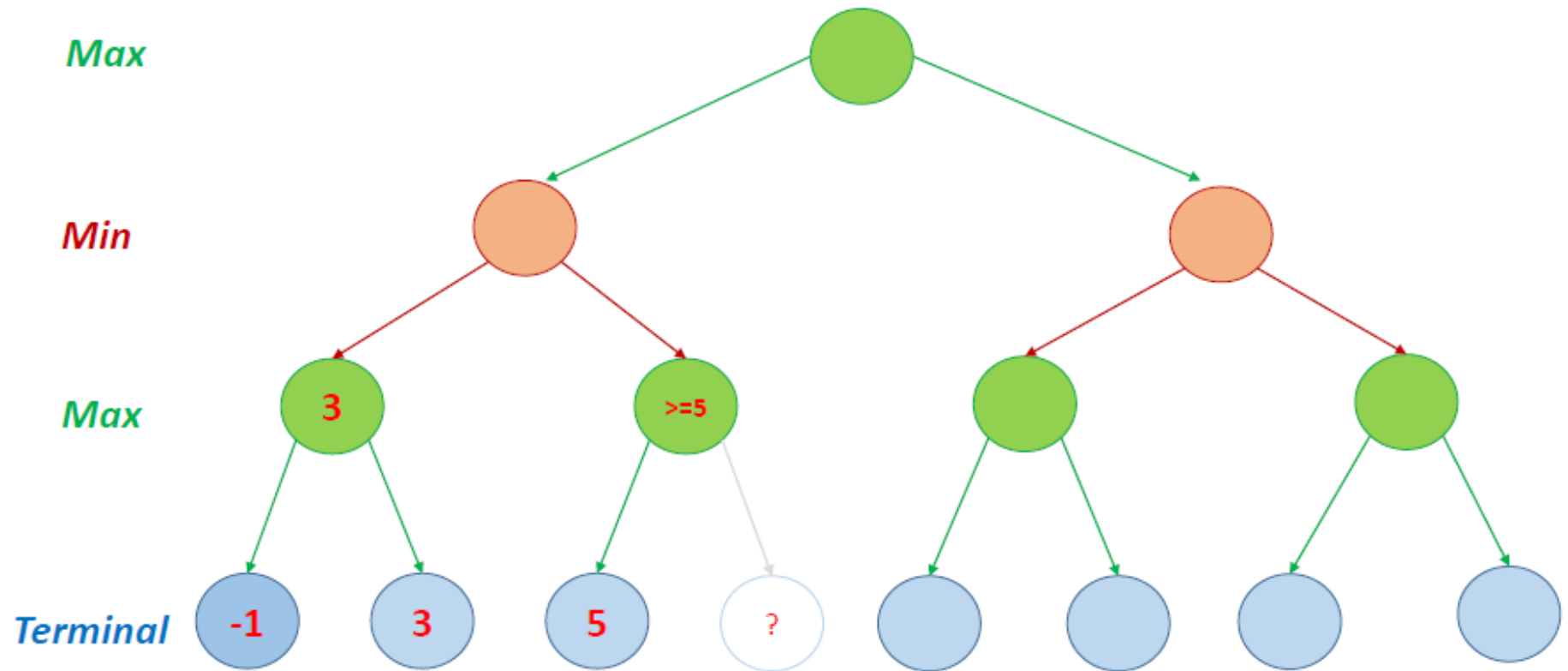# ALPHA - BETA PRUNING
Example 1

Example 1

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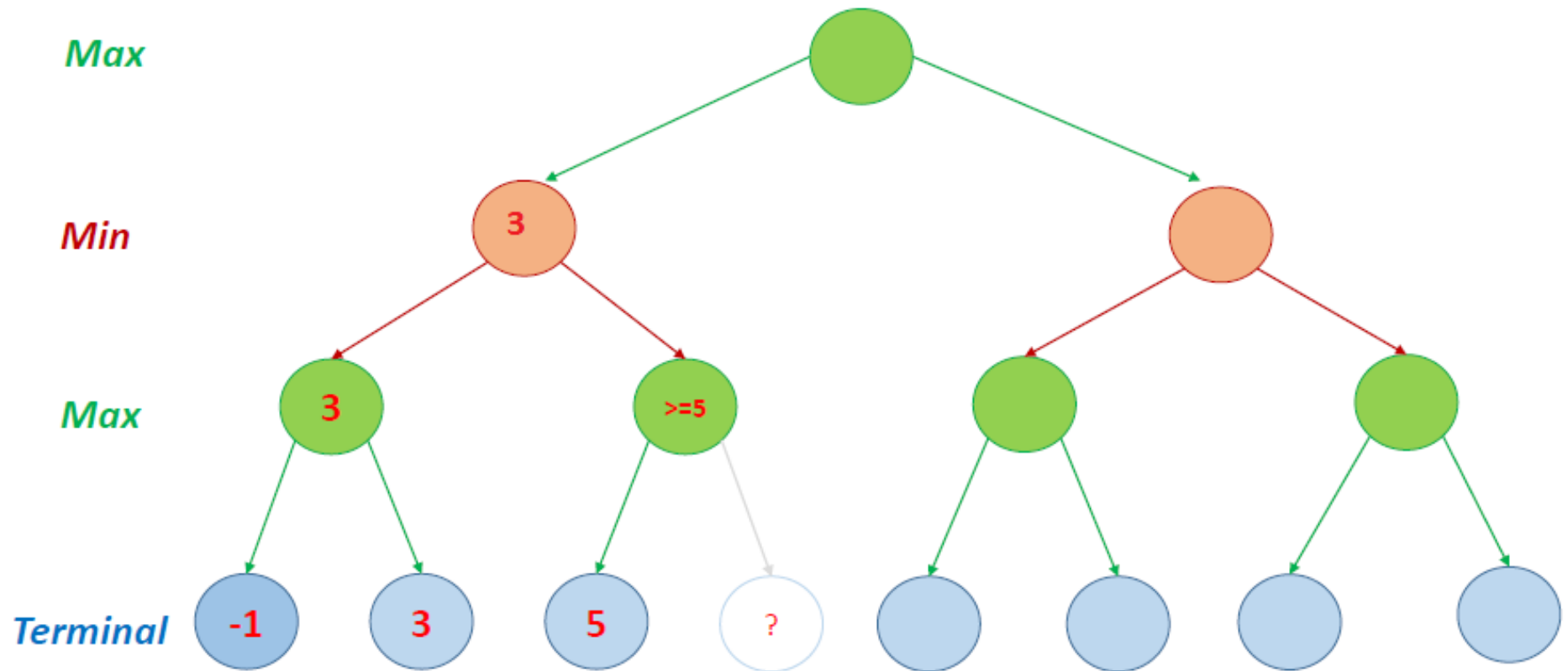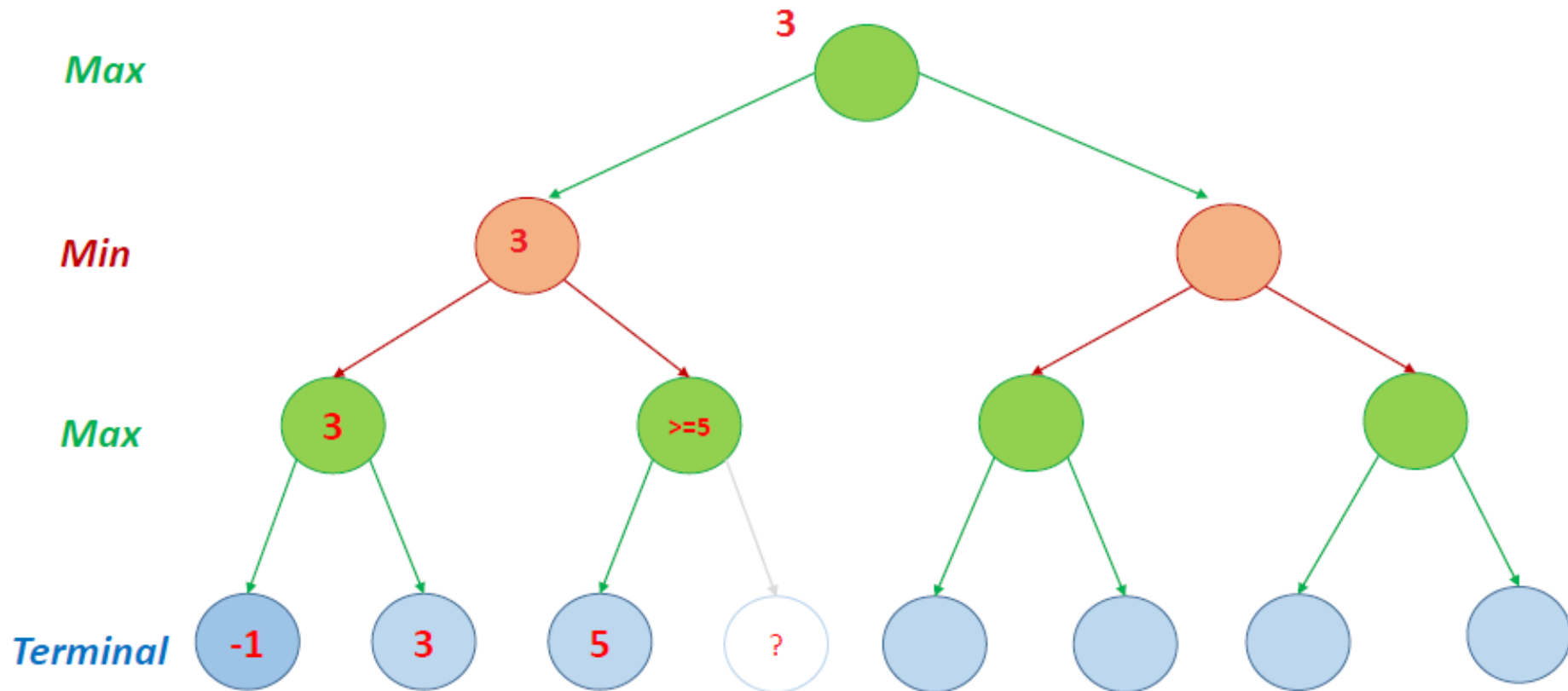
Example 1

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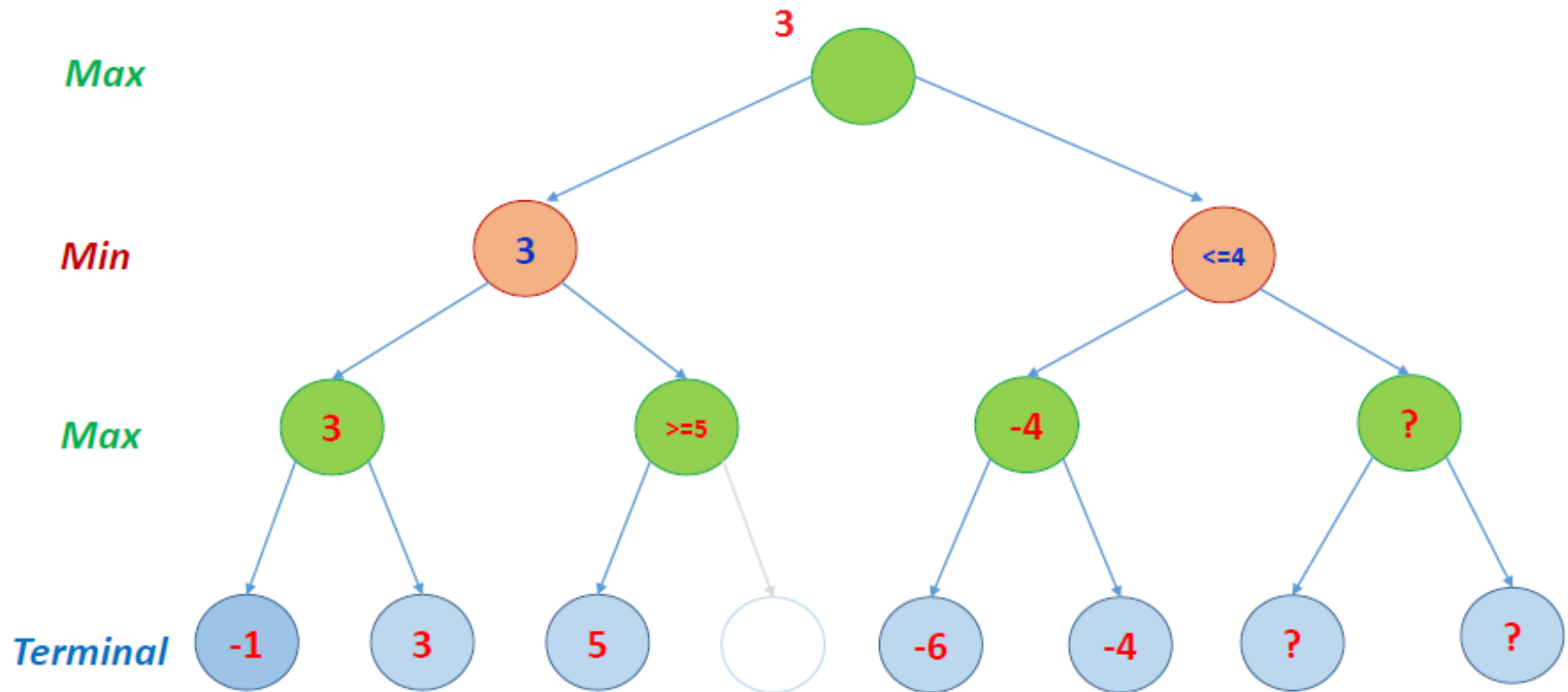# ALPHA - BETA PRUNING
Example 2
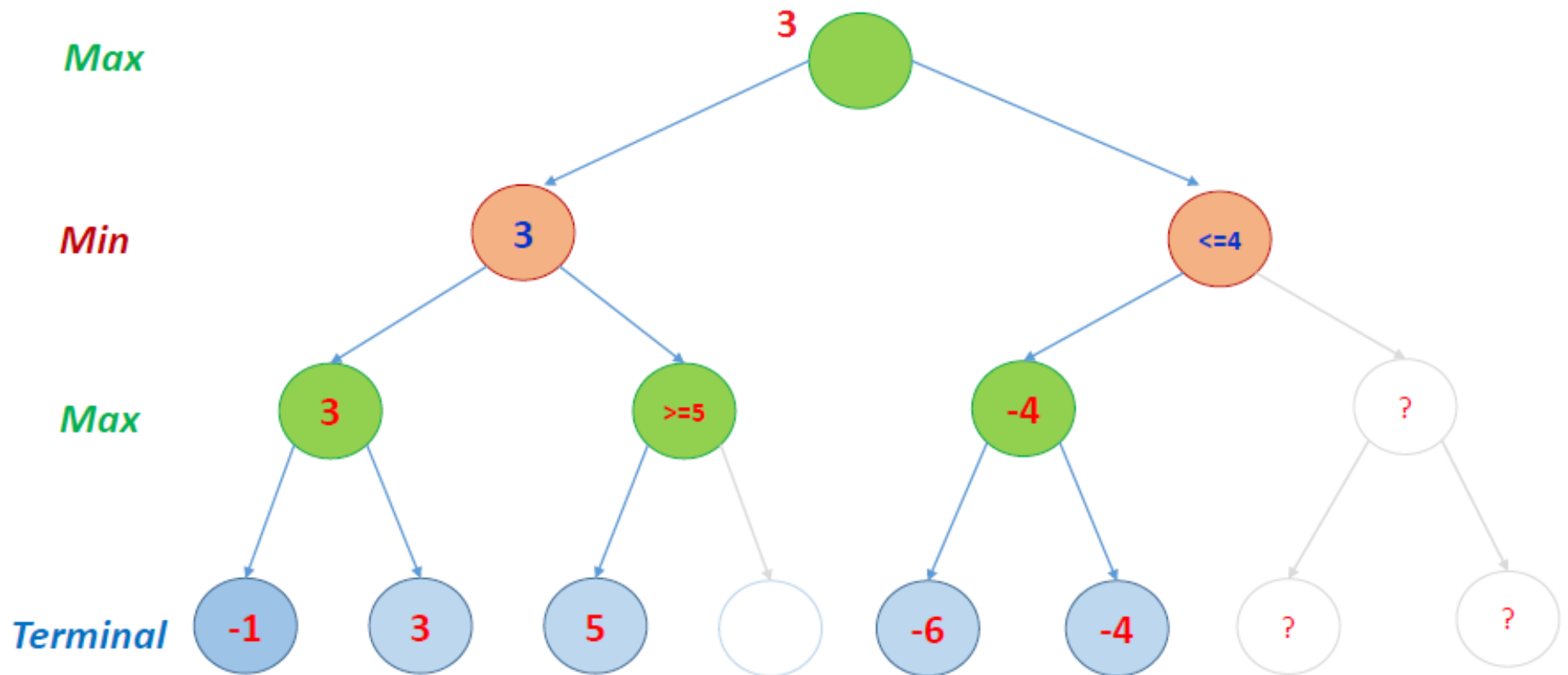
Example 2

Example 2
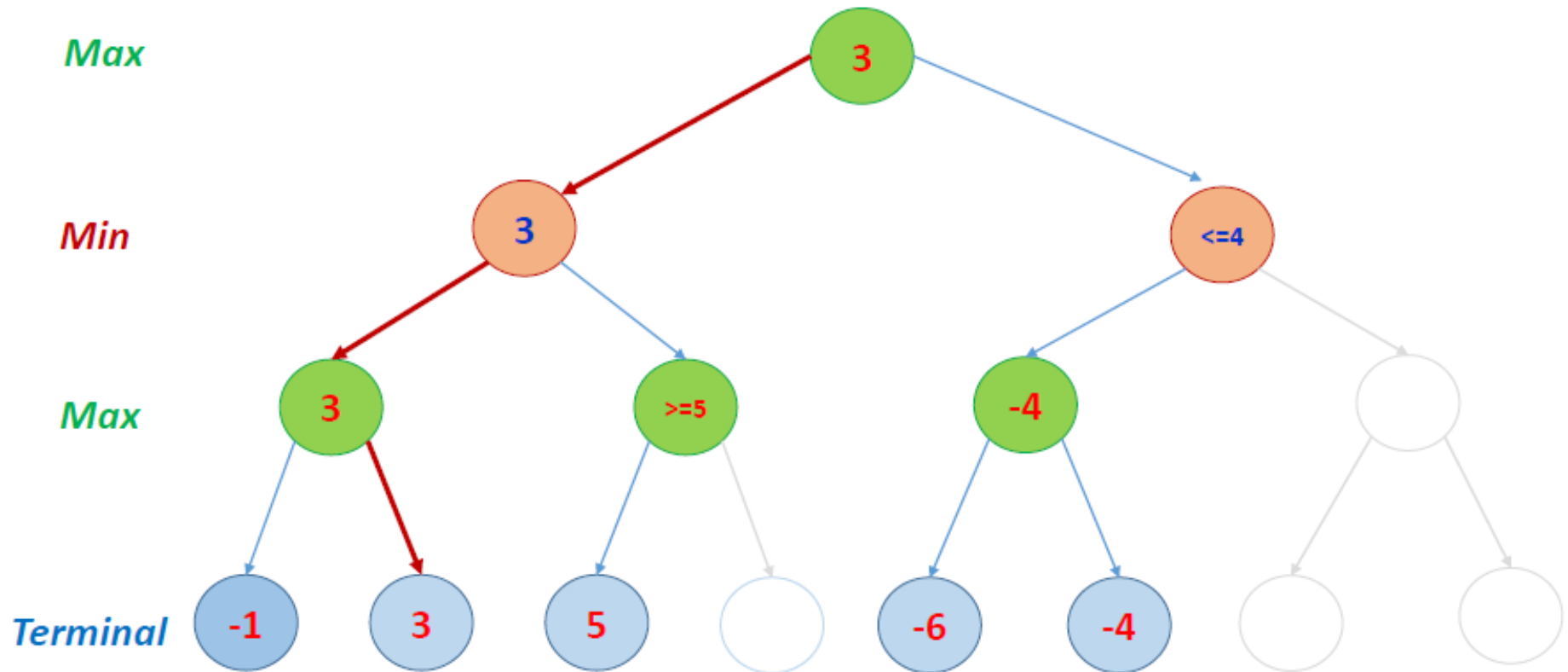
Example 2

Example 2

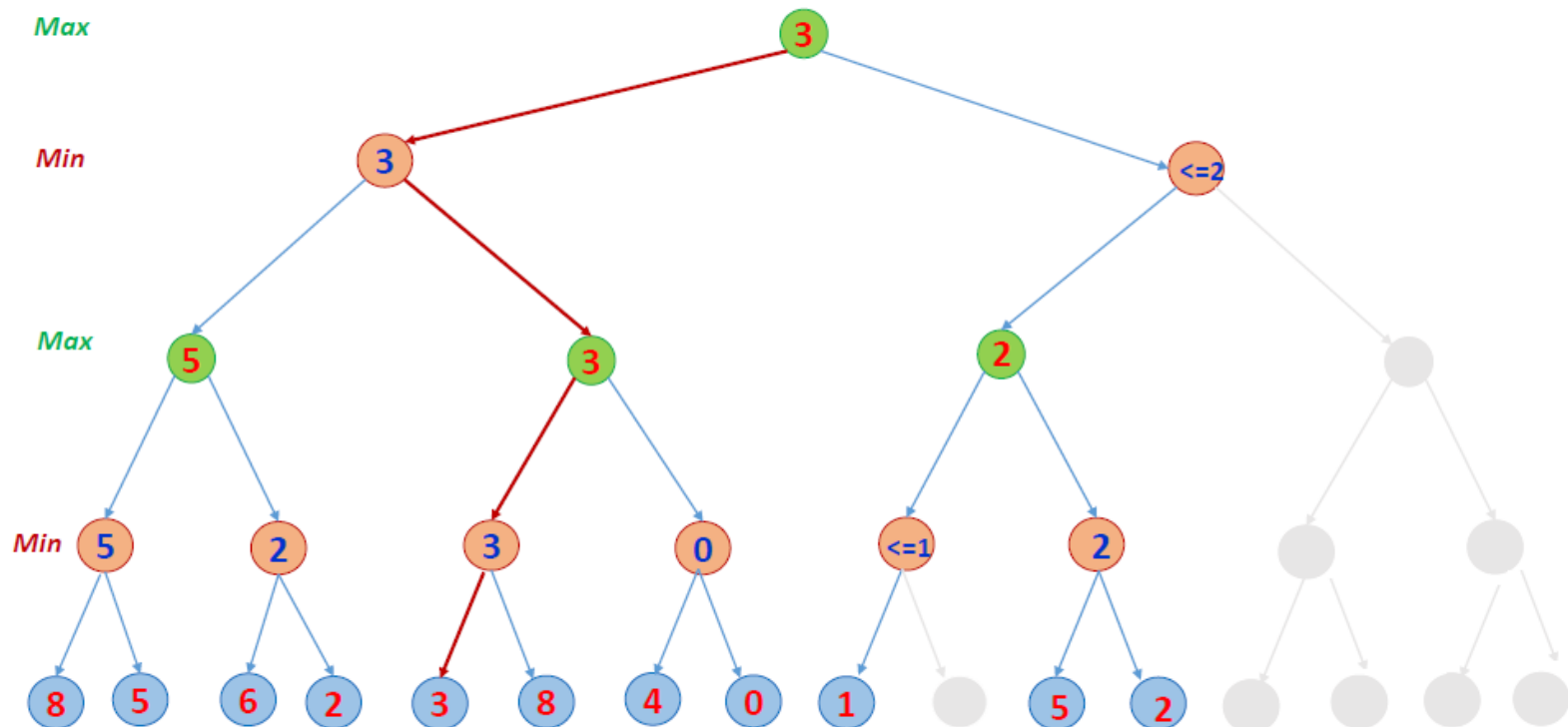# Example 2

Example 2

Example 2

Homework

- Alpha - Beta Pruning algorithm

- Benefits of Alpha - Beta Pruning.

- Give the reasoning of below alpha-beta pruning of a game tree.

References

1. Stuart Russell,Peter Norvig, "Artificial Intelligence-A Modern Approach", Pearson.

2. Elaine Rich and Kevin Knight, "Artificial Intelligence", McGraw-Hill.

3. E Charniak and D McDermott, "Introduction to Artificial Intelligence", Pearson.

4. PPT of Dr.R.DeviPriya, Associate Professor, Department of Information Technology, KonguEngineering College

5. https://www.geeksforgeeks.org/minimax-algorithm-in-game-theory-set-4-alpha-beta-pruning/

6. Slide-2 image via https://www.euroyardservice.com/services/trees-shrub-trimming/

Thank You.