SINGAPORE UNIVERSITY OF TECHNOLOGY AND DESIGN

Week 9 Exercises

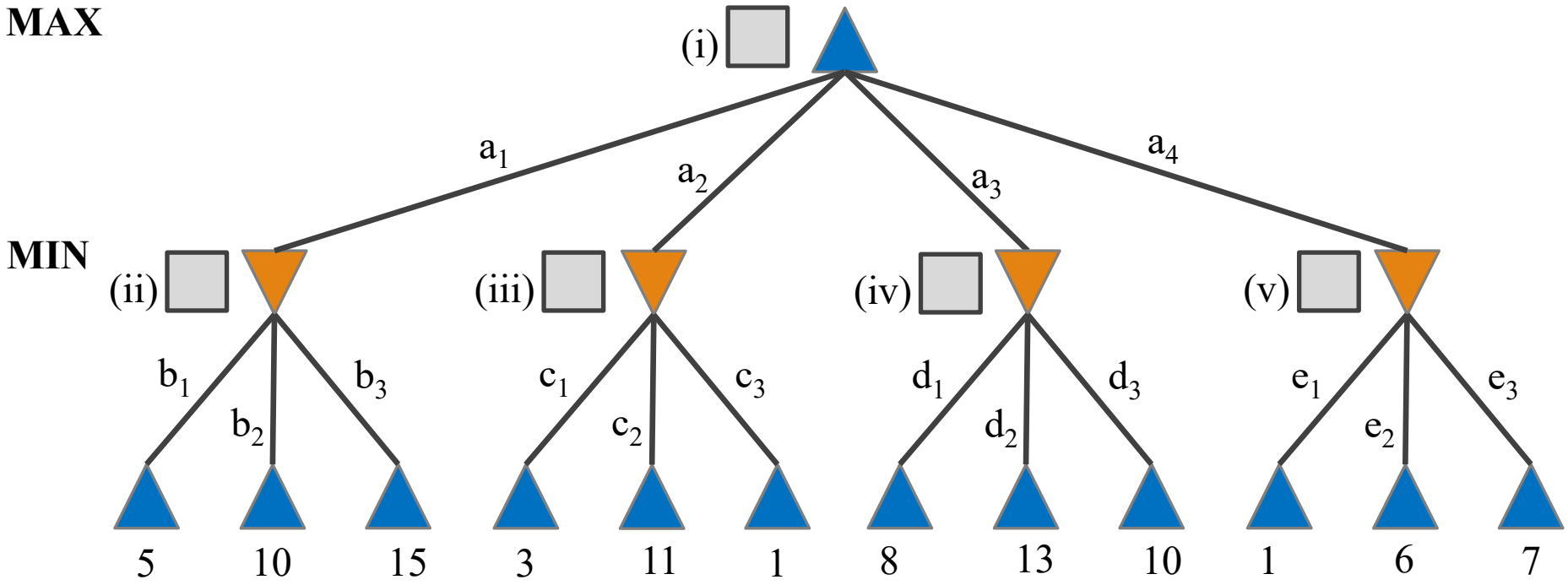
Adversarial Search

PROF. LIM KWAN HUI

50.021 Artificial Intelligence

The following notes are compiled from various sources such as textbooks, lecture materials, Web resources and are shared for academic purposes only, intended for use by students registered for a specific course. In the interest of brevity, every source is not cited. The compiler of these notes gratefully acknowledges all such sources.

Exercise: MiniMax



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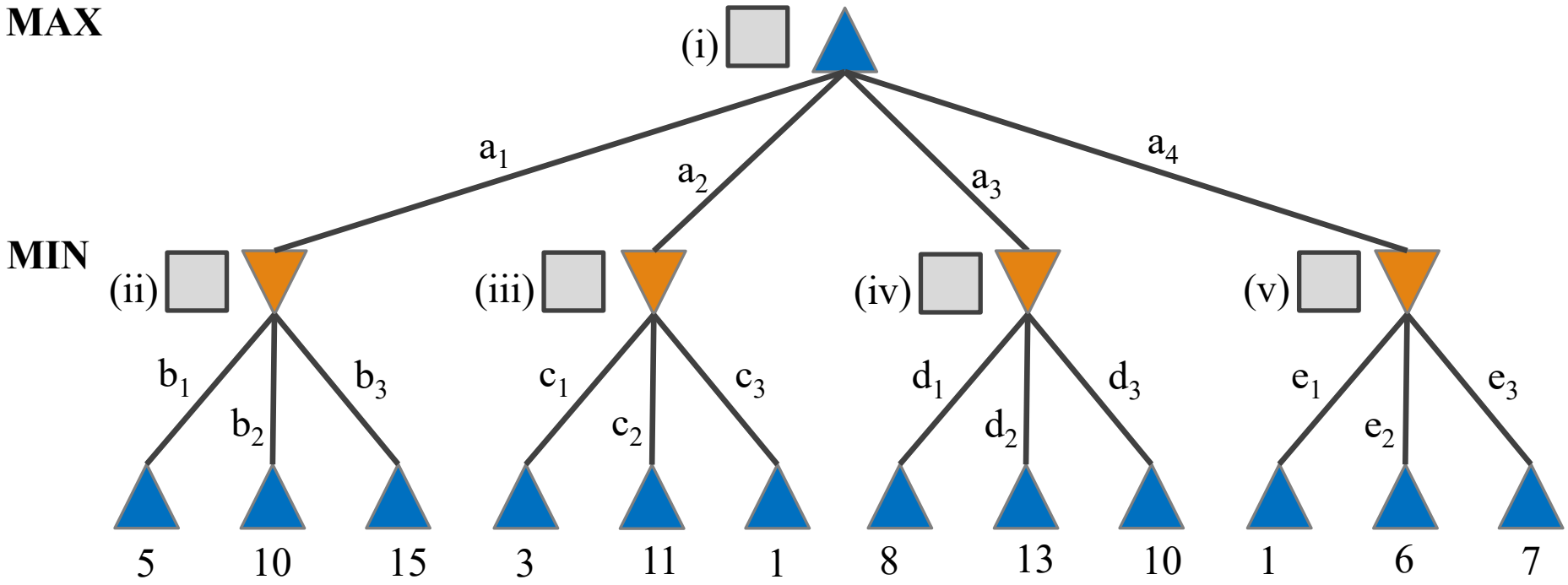

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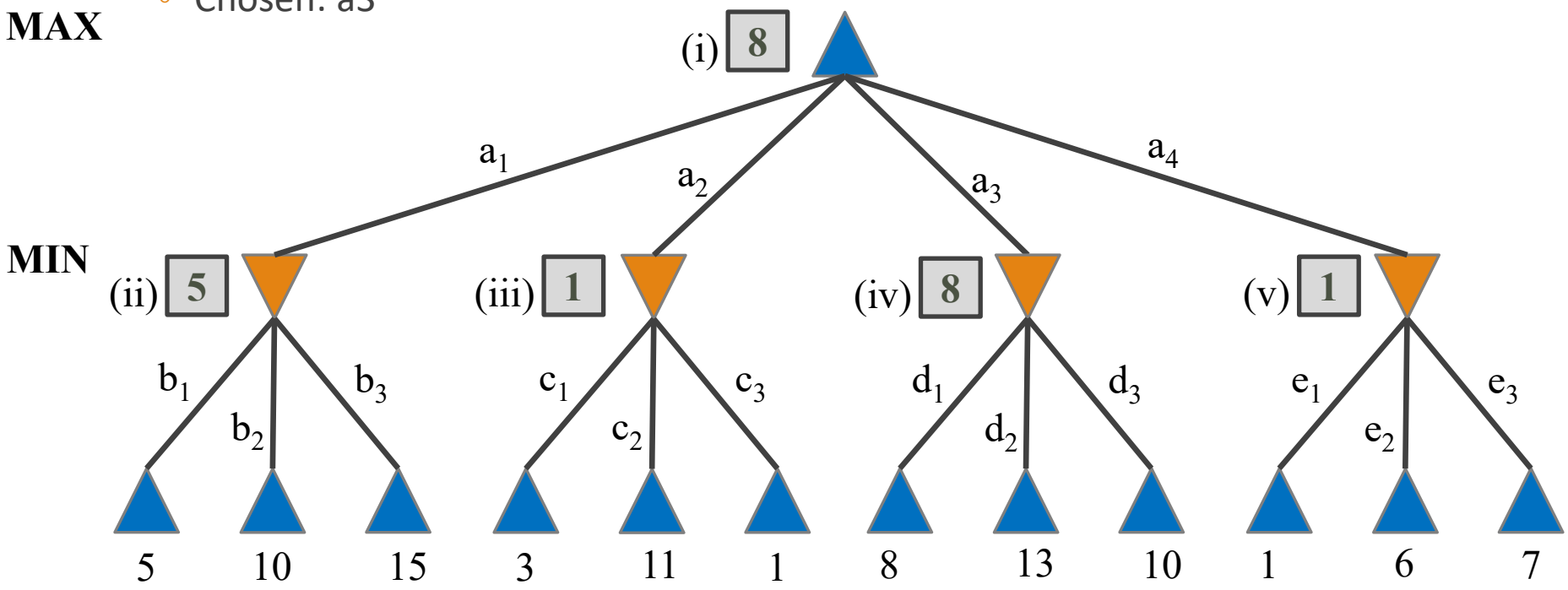
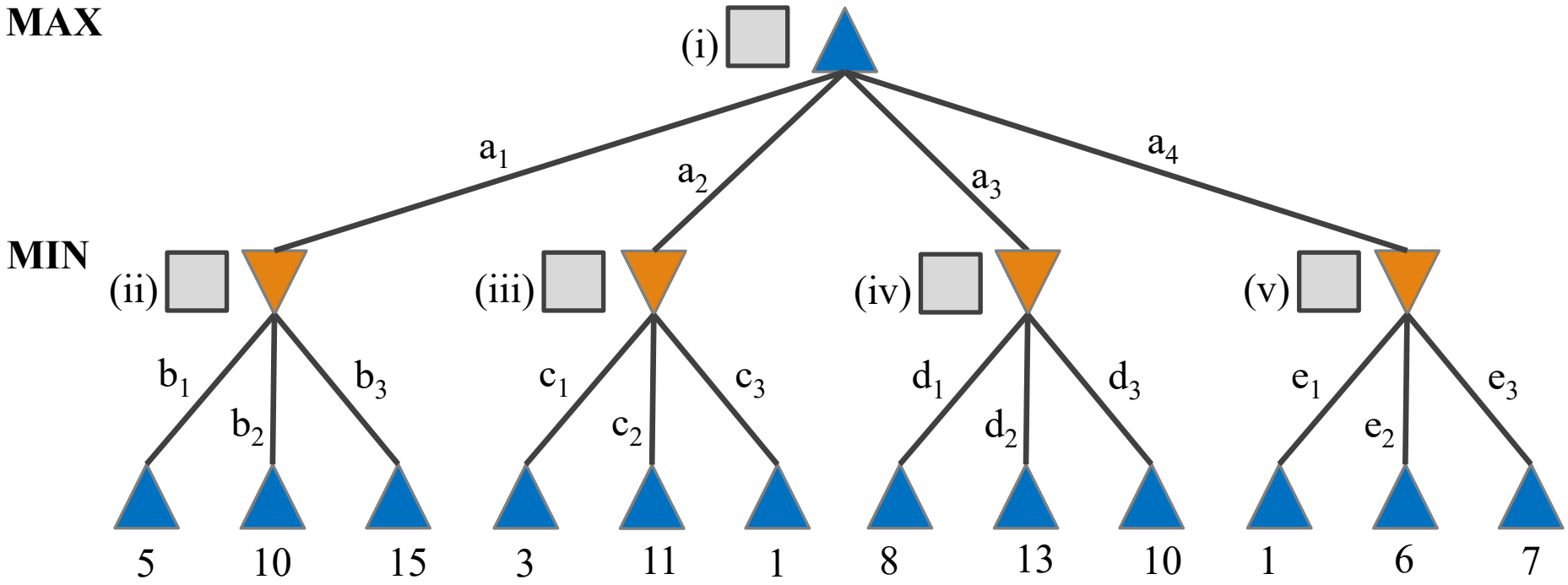
  - Chosen: a3



Exercise: MiniMax with α-β

- Apply the **MiniMax algorithm with α-β pruning** on this game tree. Assume that moves/actions are explored in lowest alphabetical order. List down the moves/actions that were pruned (not explored at all), if any.



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Simple Intuitive Solution

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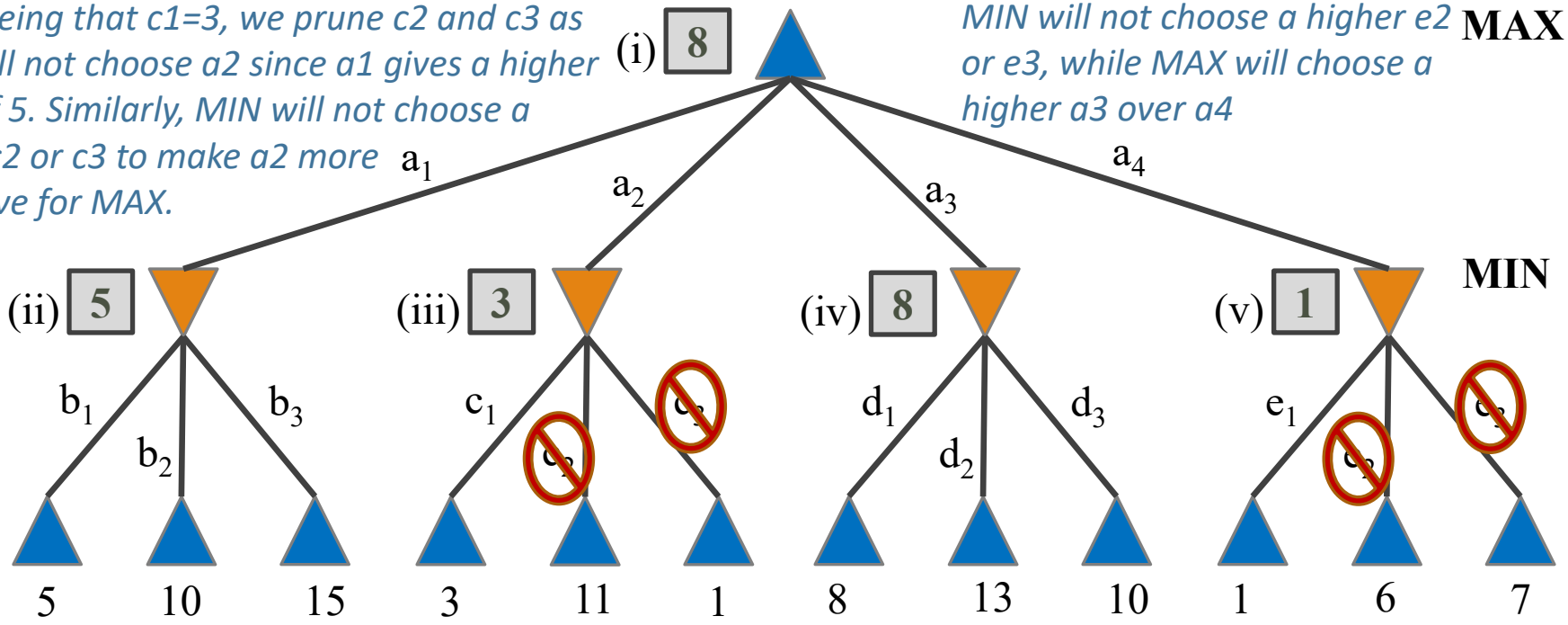
  - Pruned: c2, c3, e2, e3

After seeing that c1=3, we prune c2 and c3 as MAX will not choose a2 since a1 gives a higher score of 5. Similarly, MIN will not choose a higher c2 or c3 to make a2 more attractive for MAX.

Similar reasoning for e2 and e3. MIN will not choose a higher e2 or e3, while MAX will choose a higher a3 over a4



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Detailed Steps

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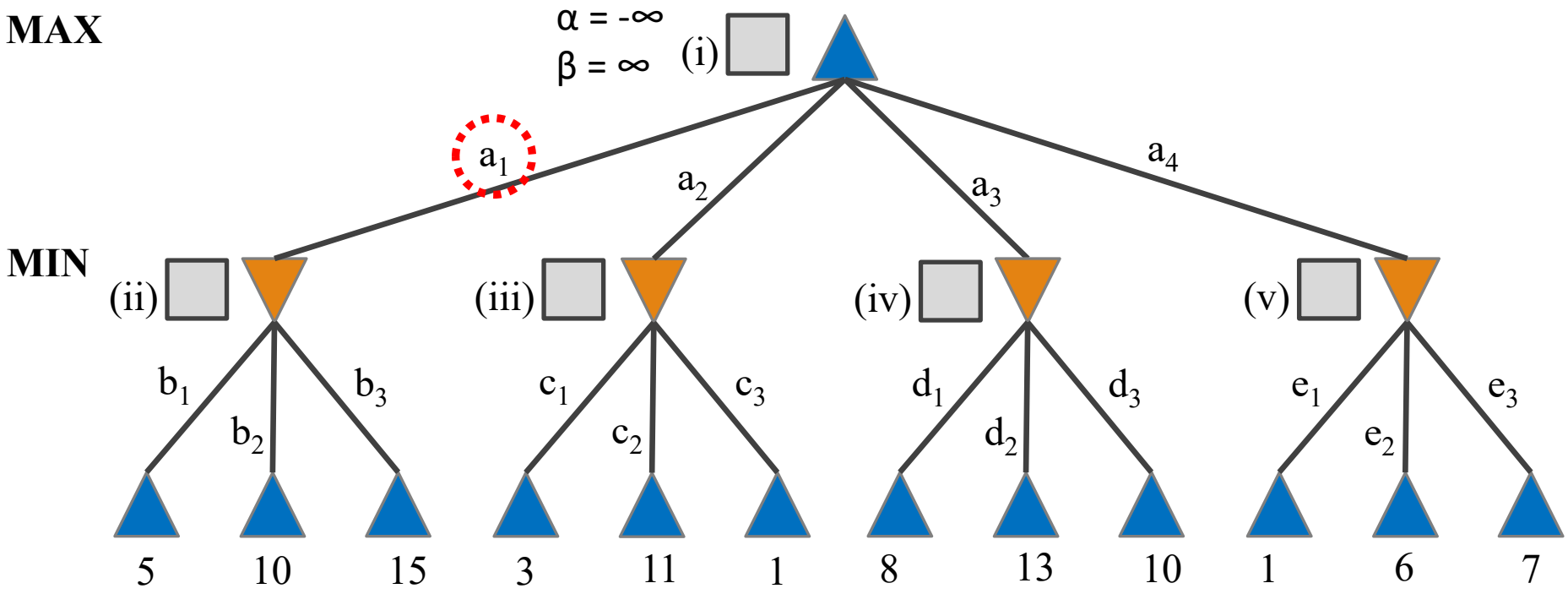

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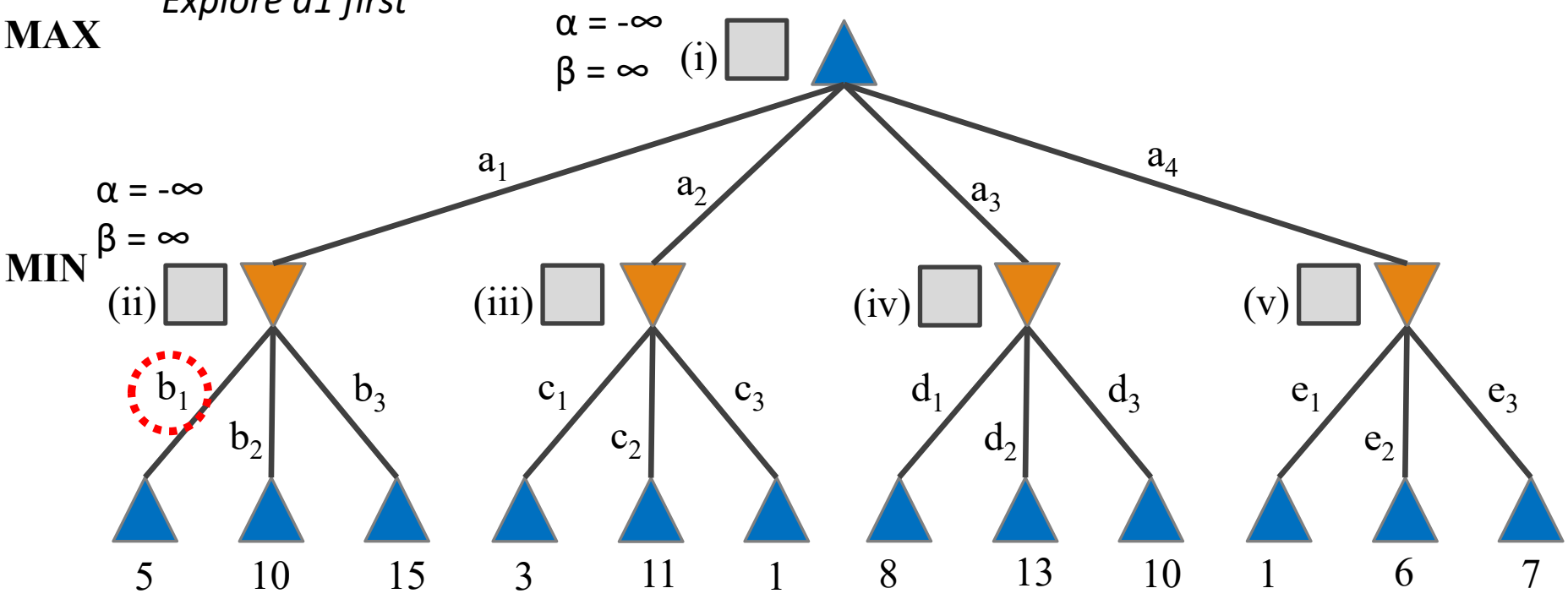
Explore a1 first



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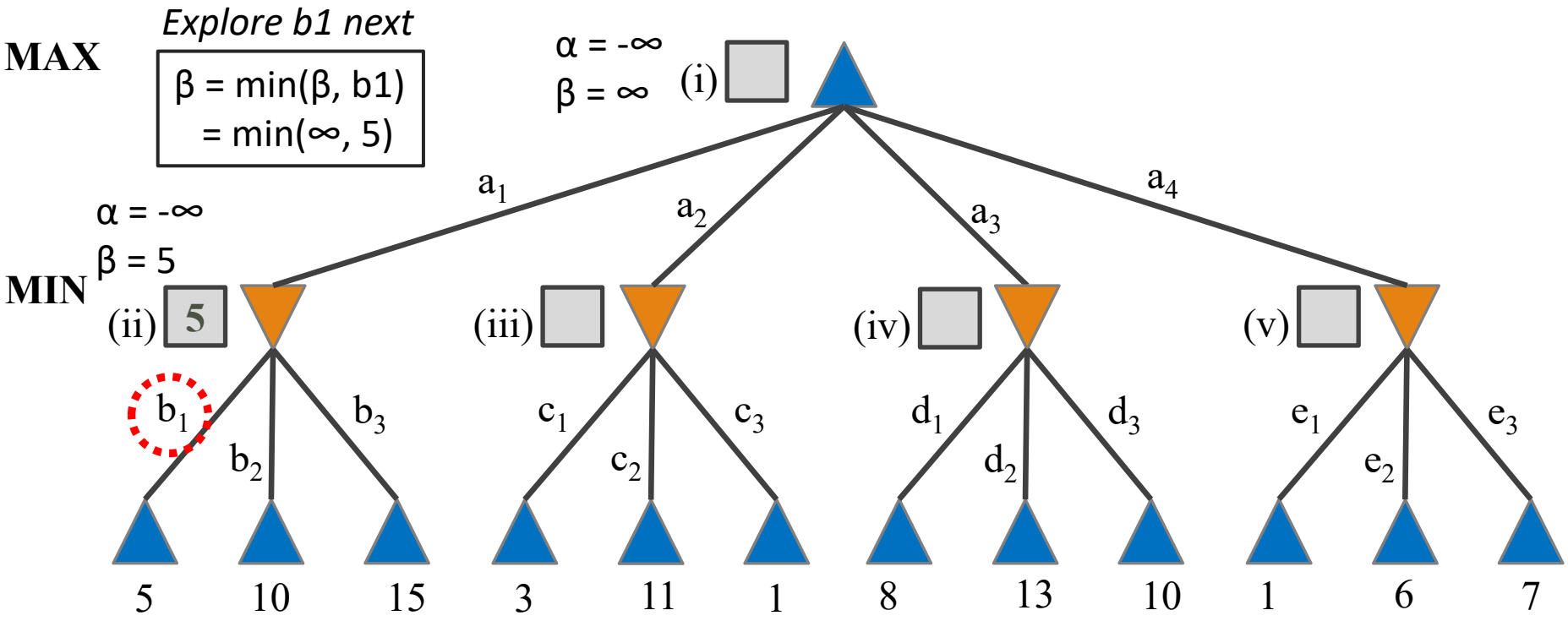

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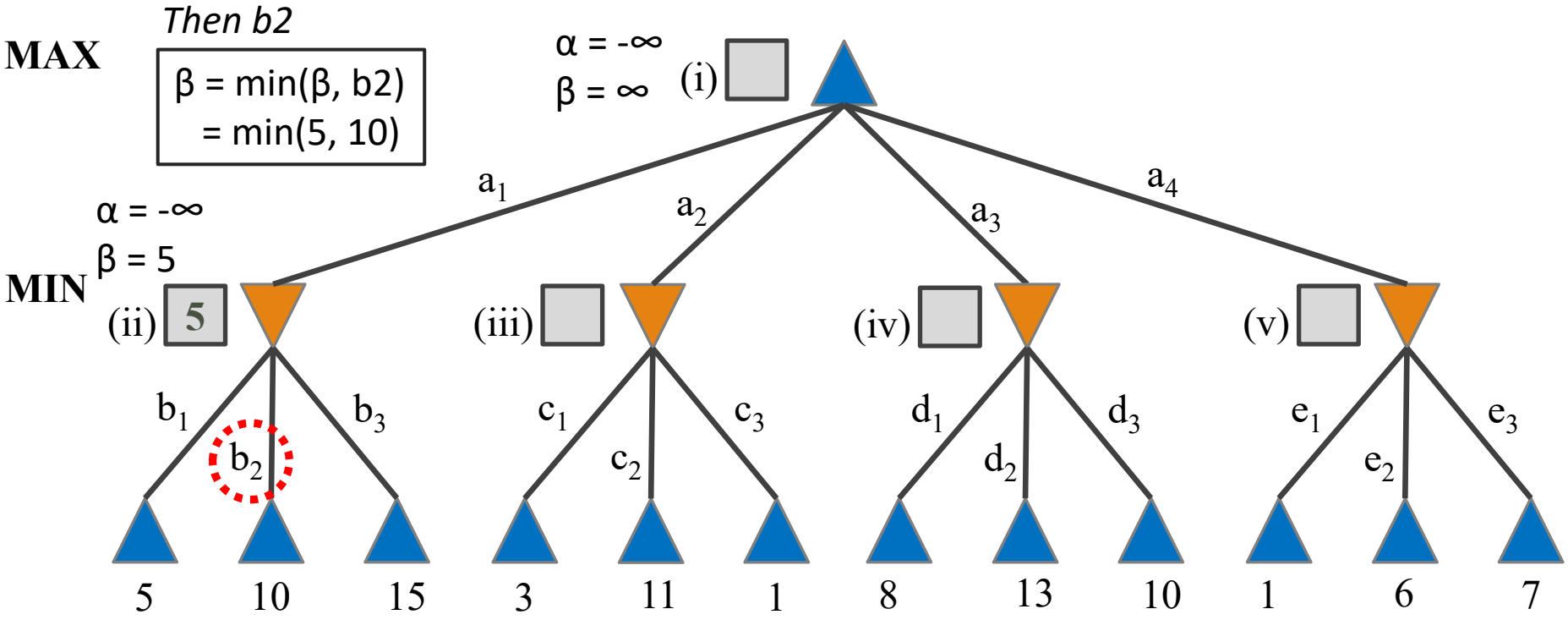

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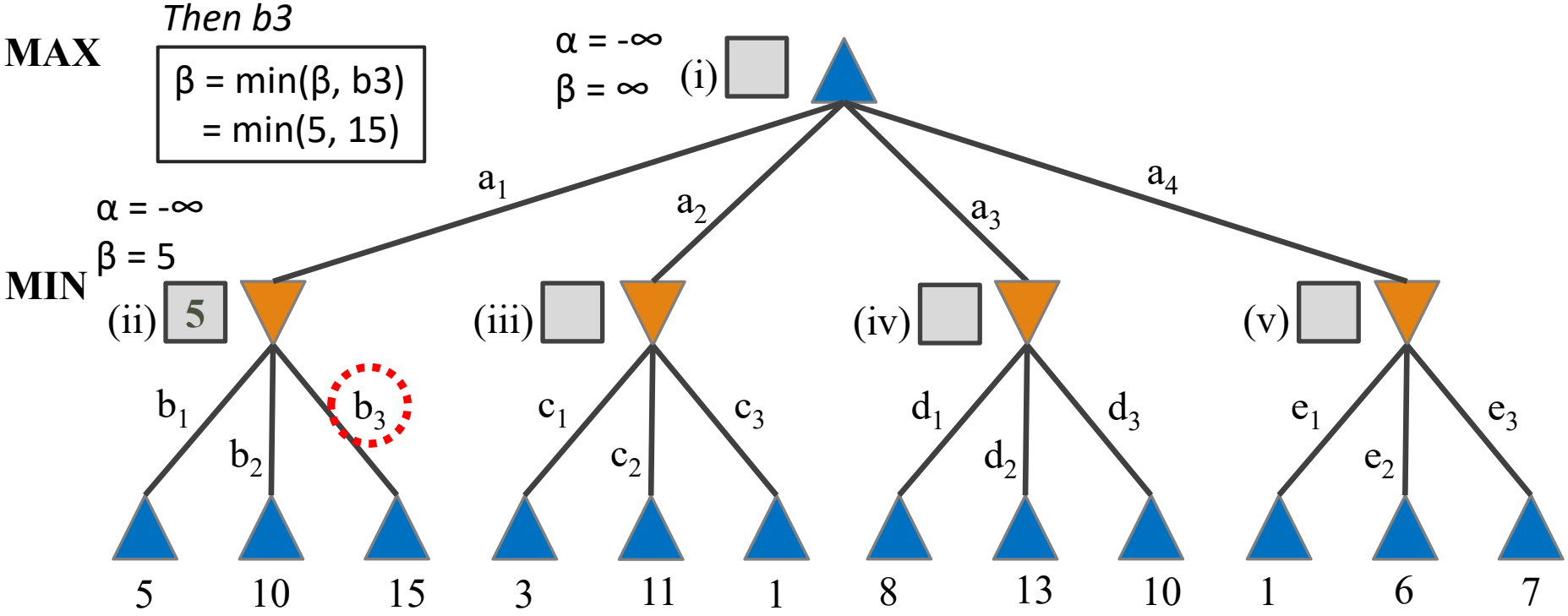

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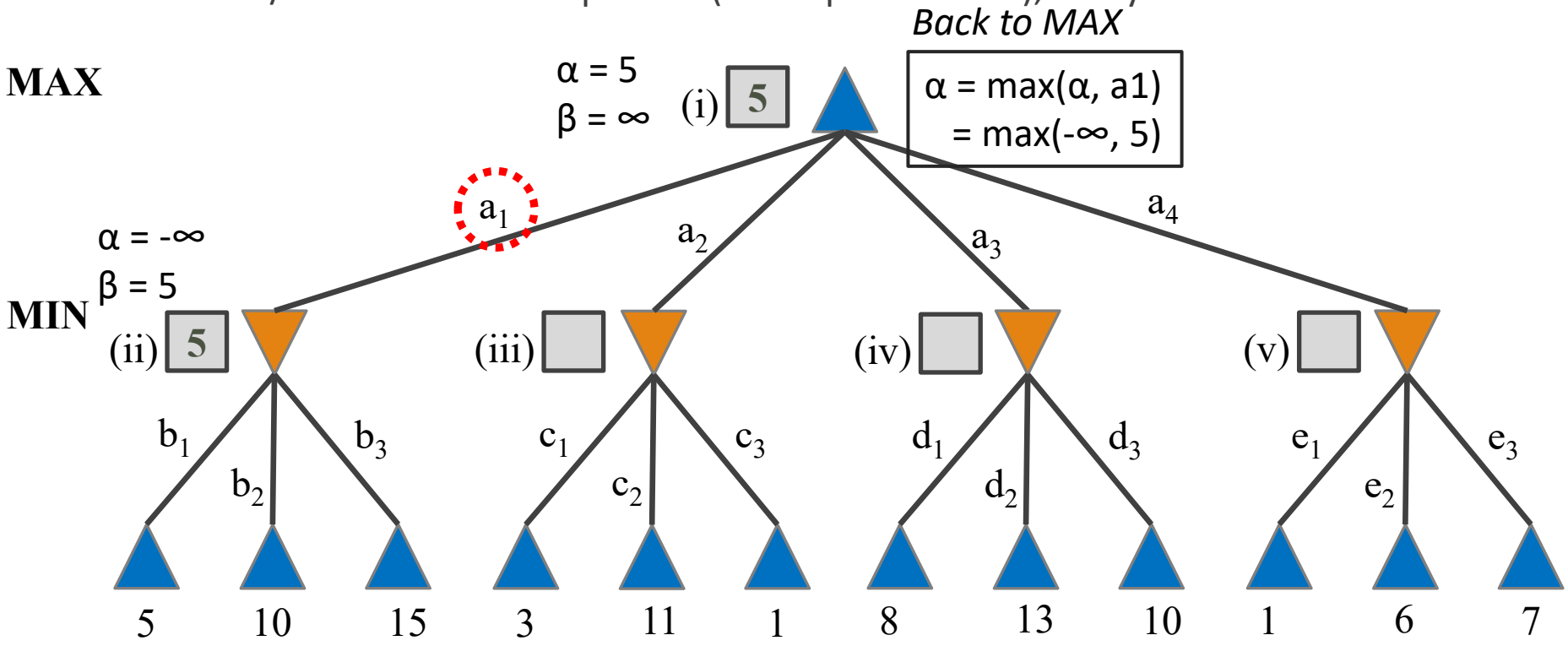

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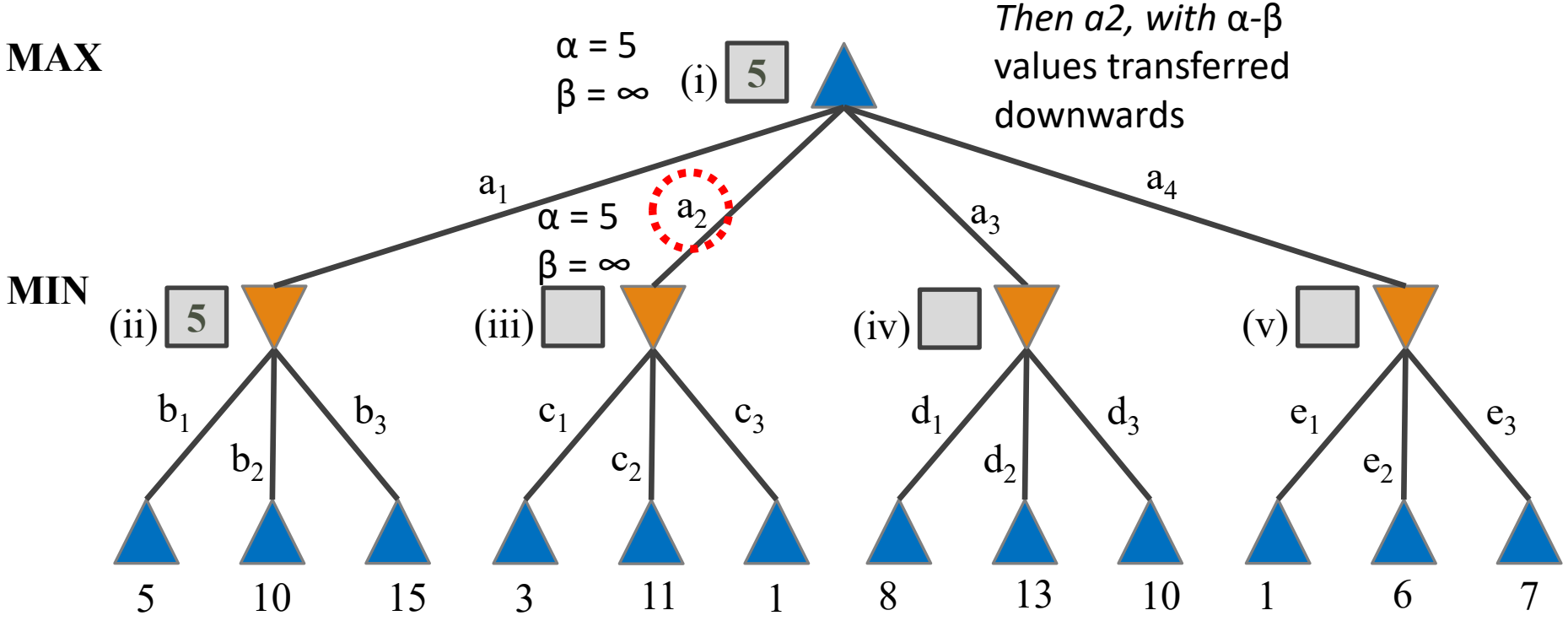

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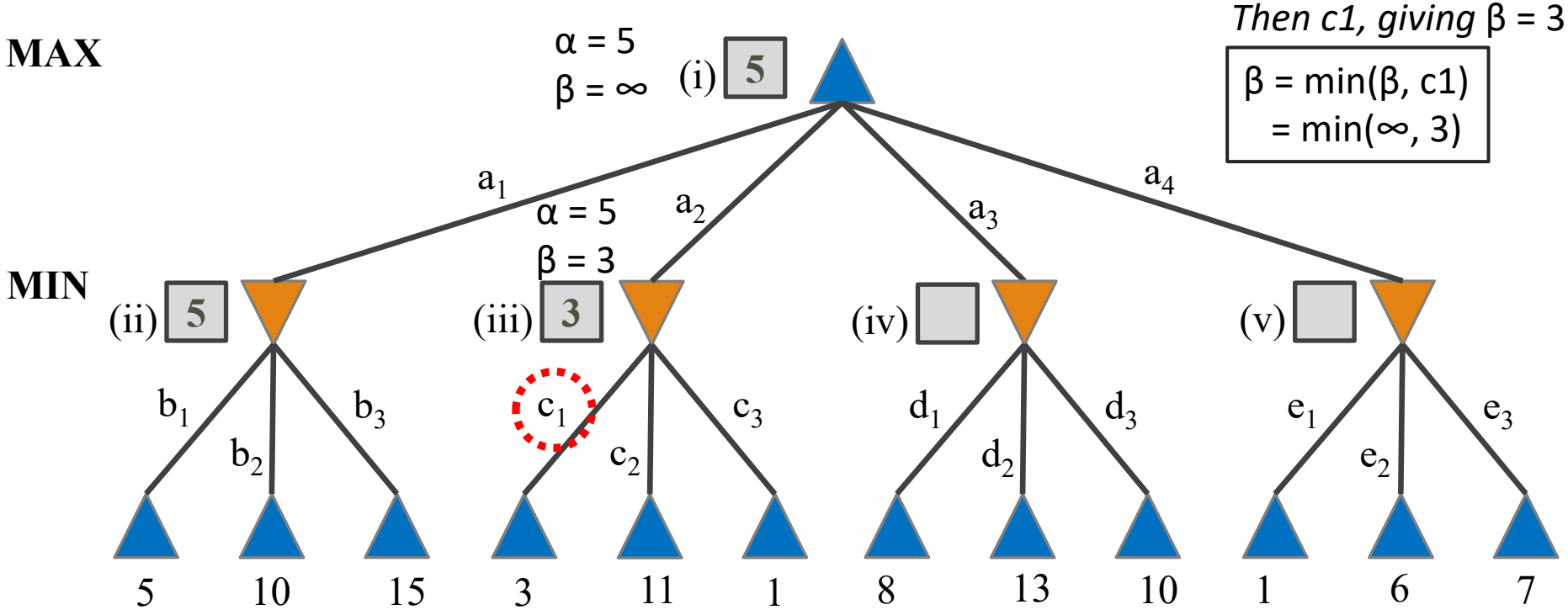

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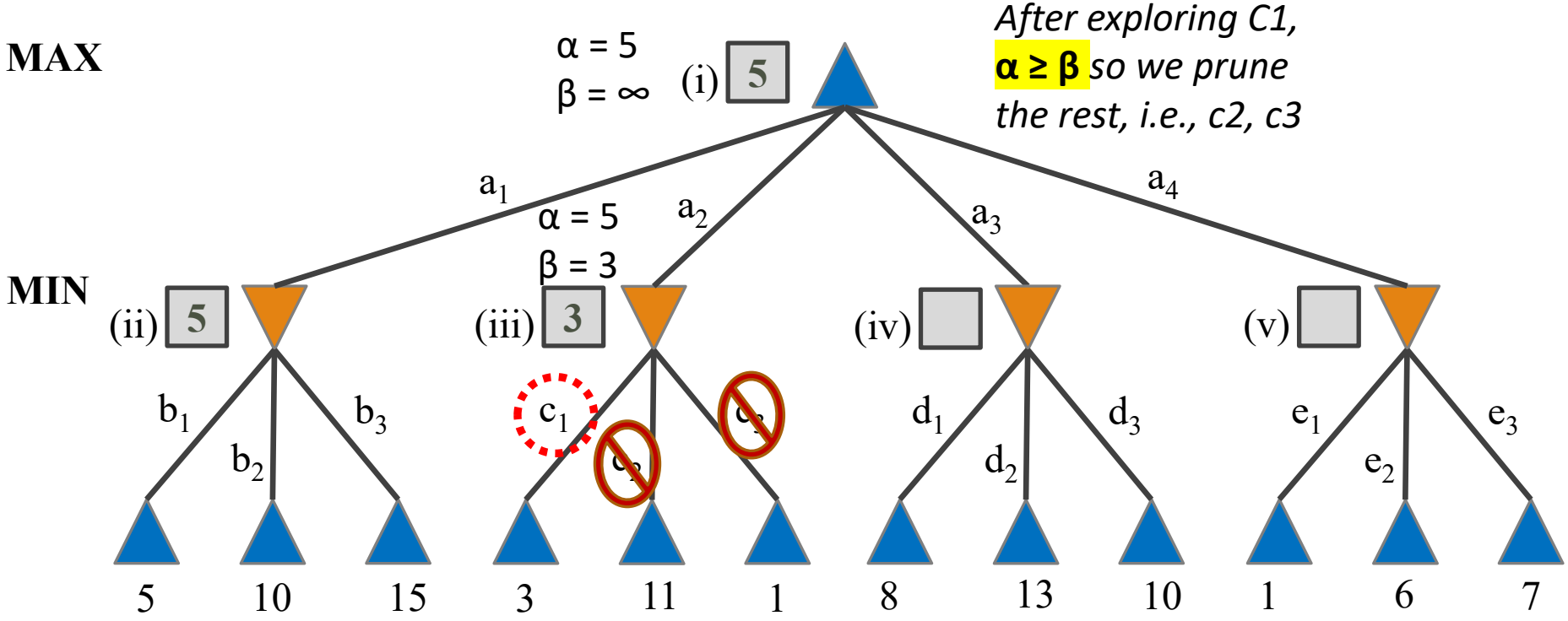

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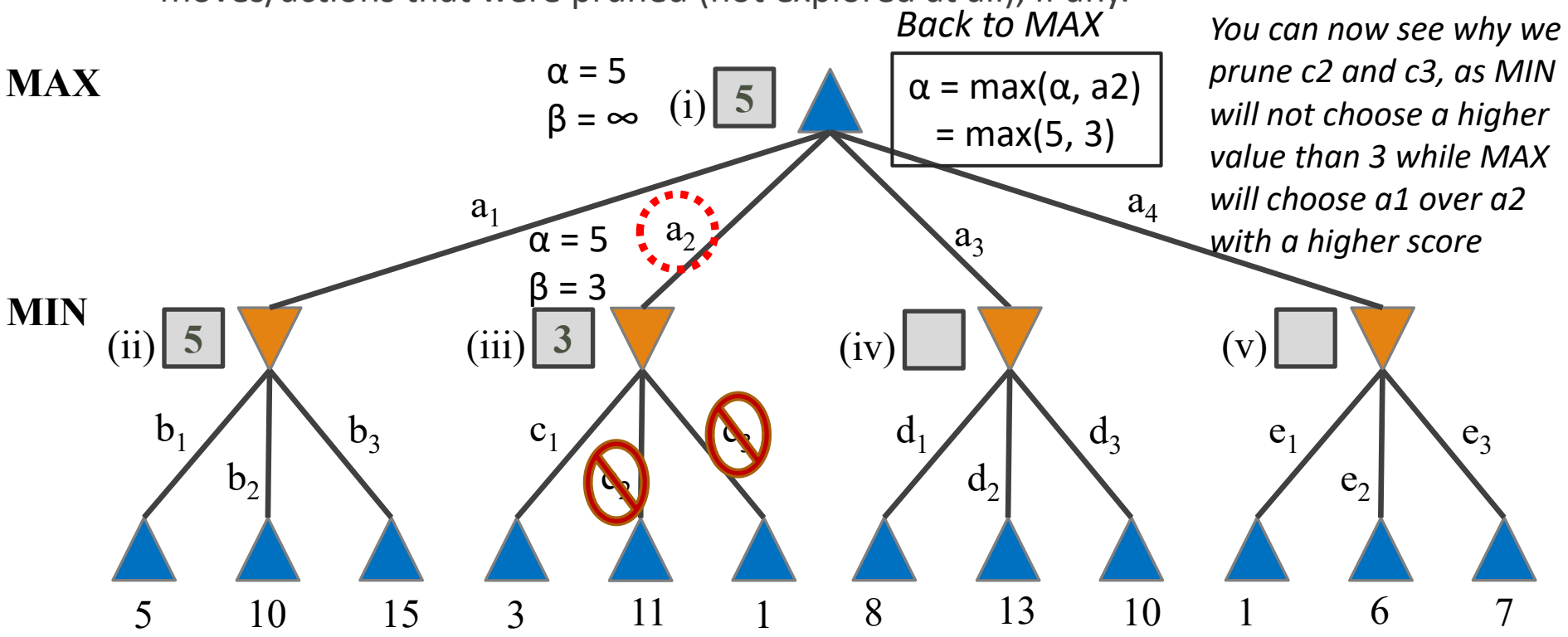

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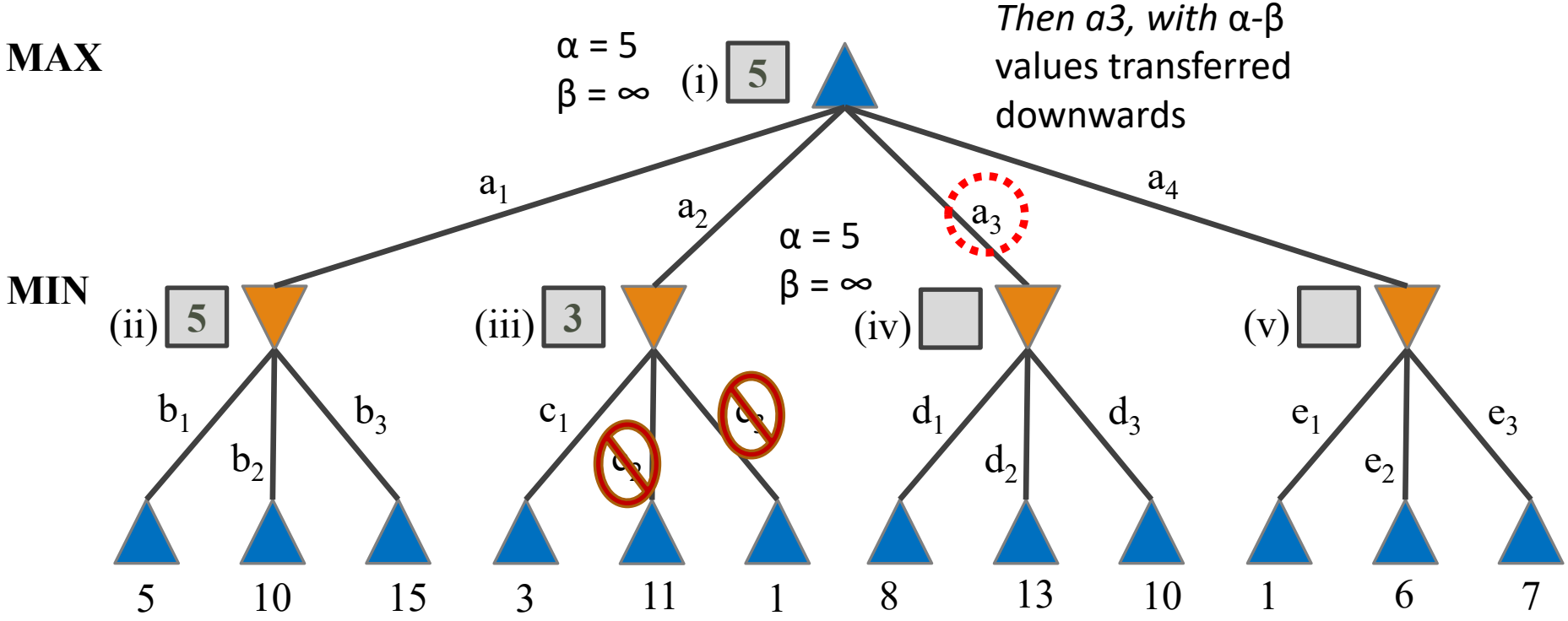

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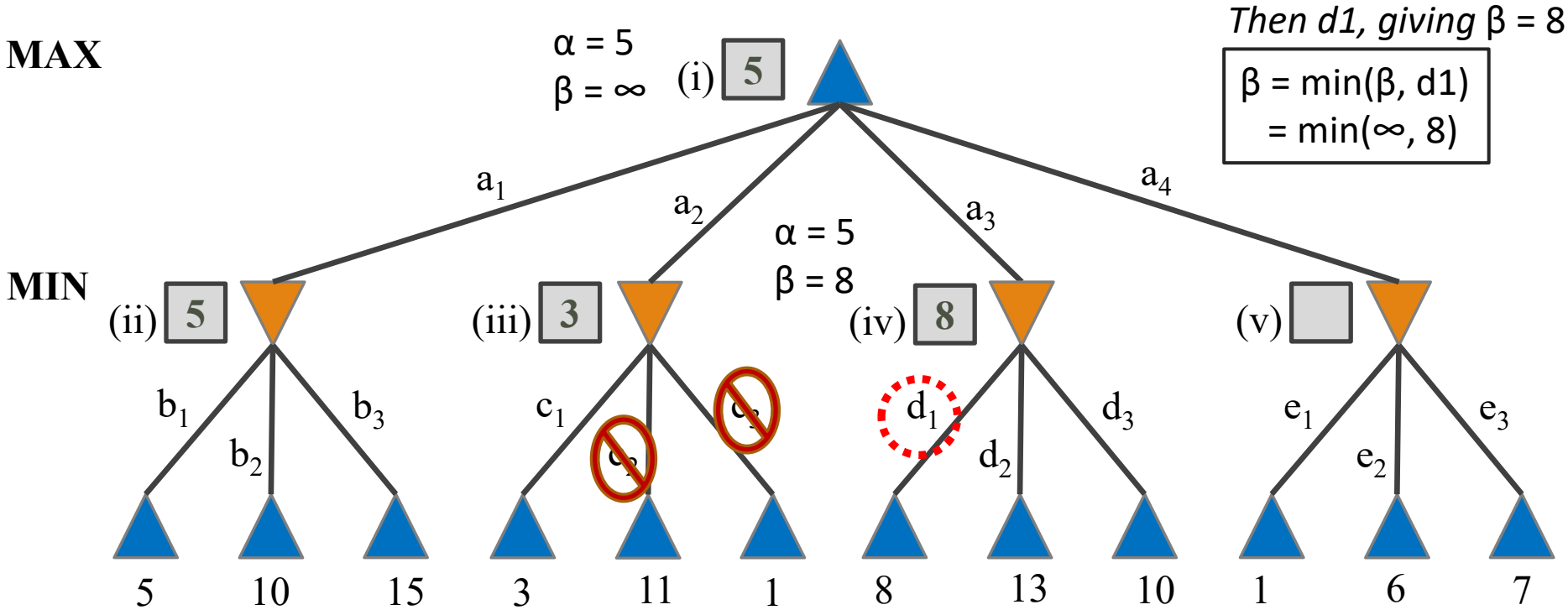

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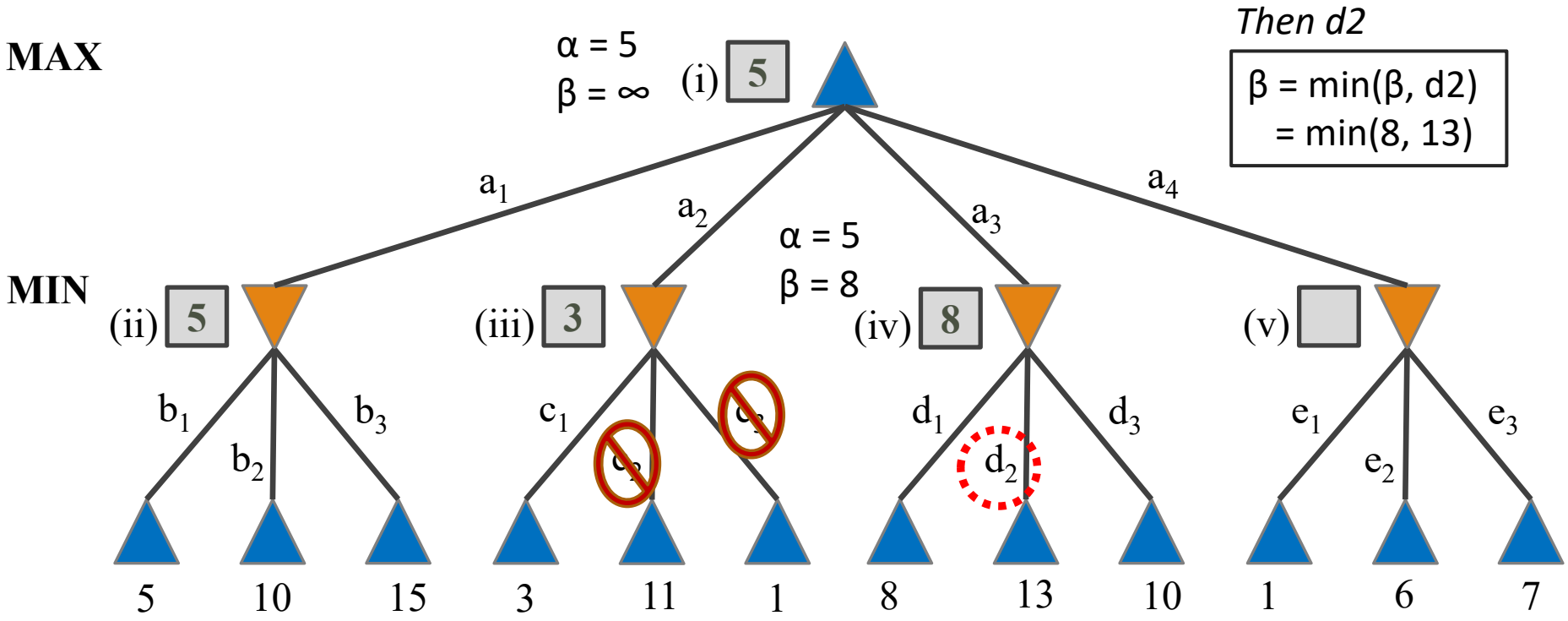

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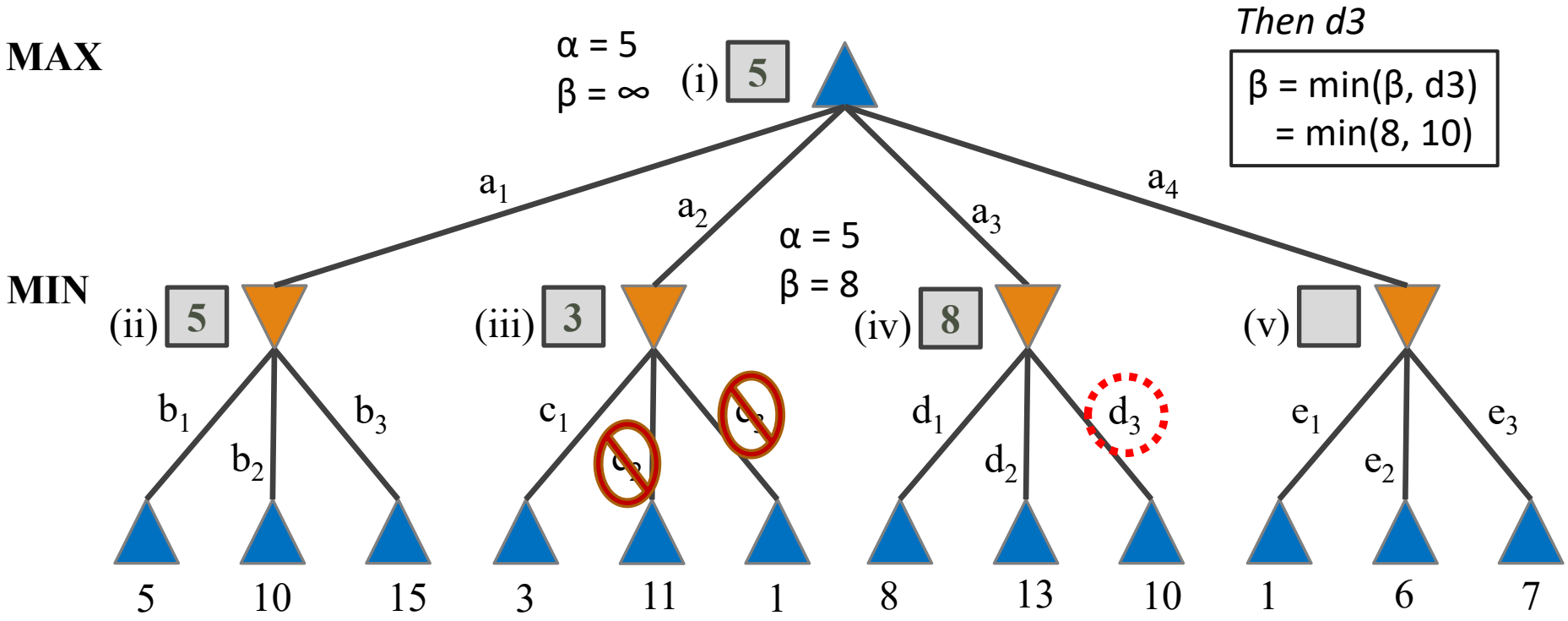

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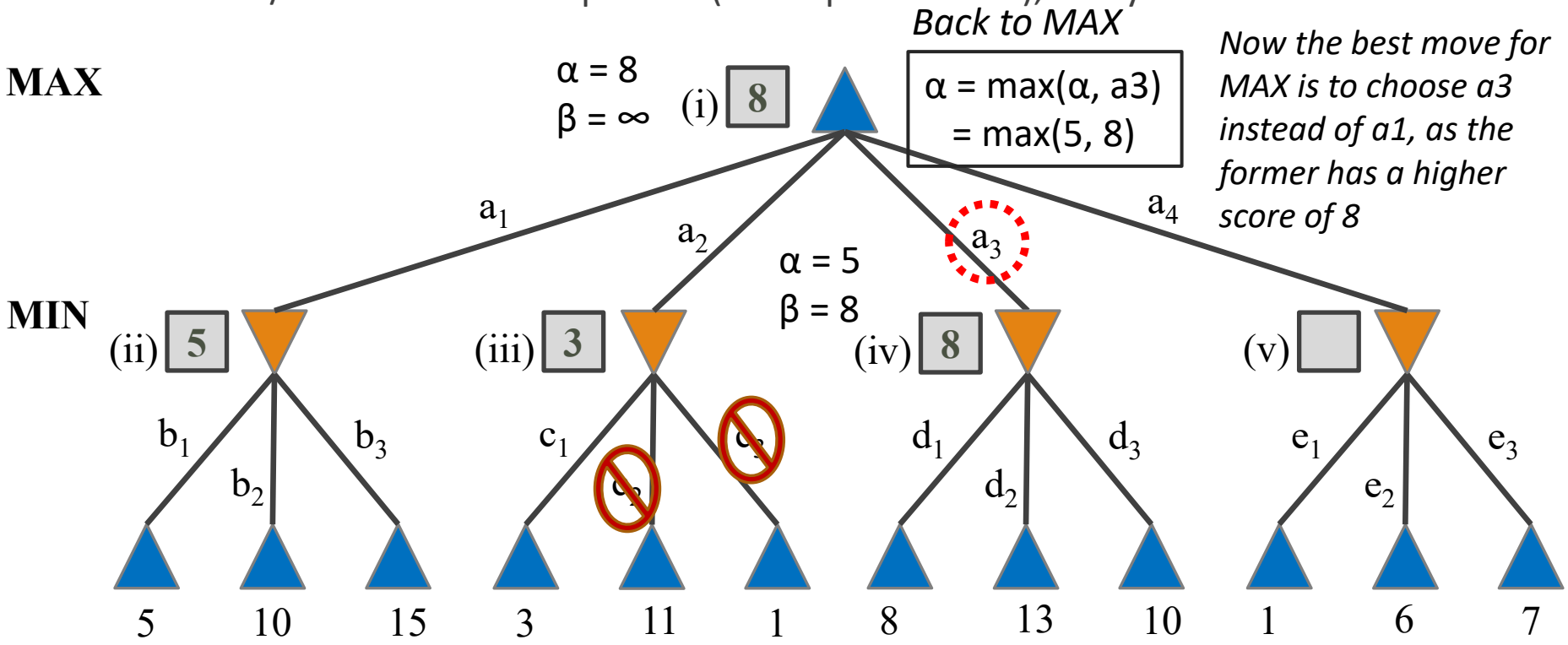

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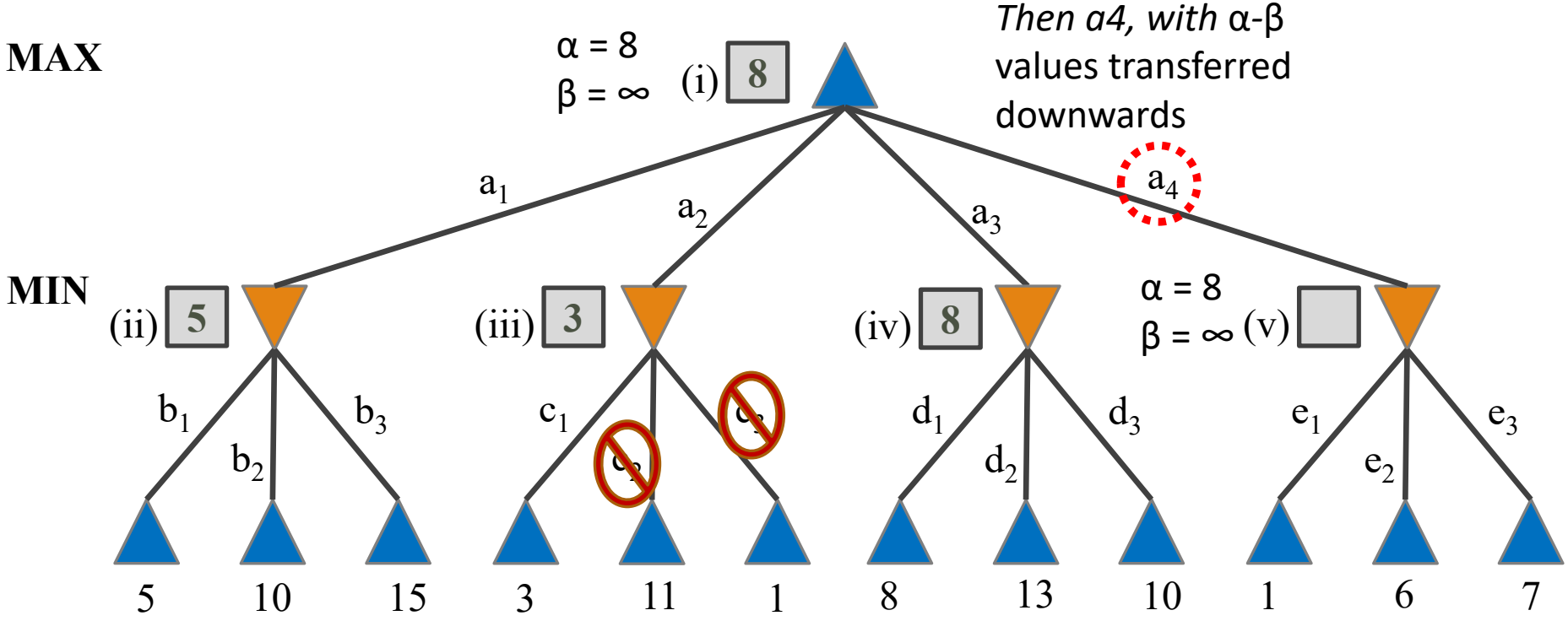

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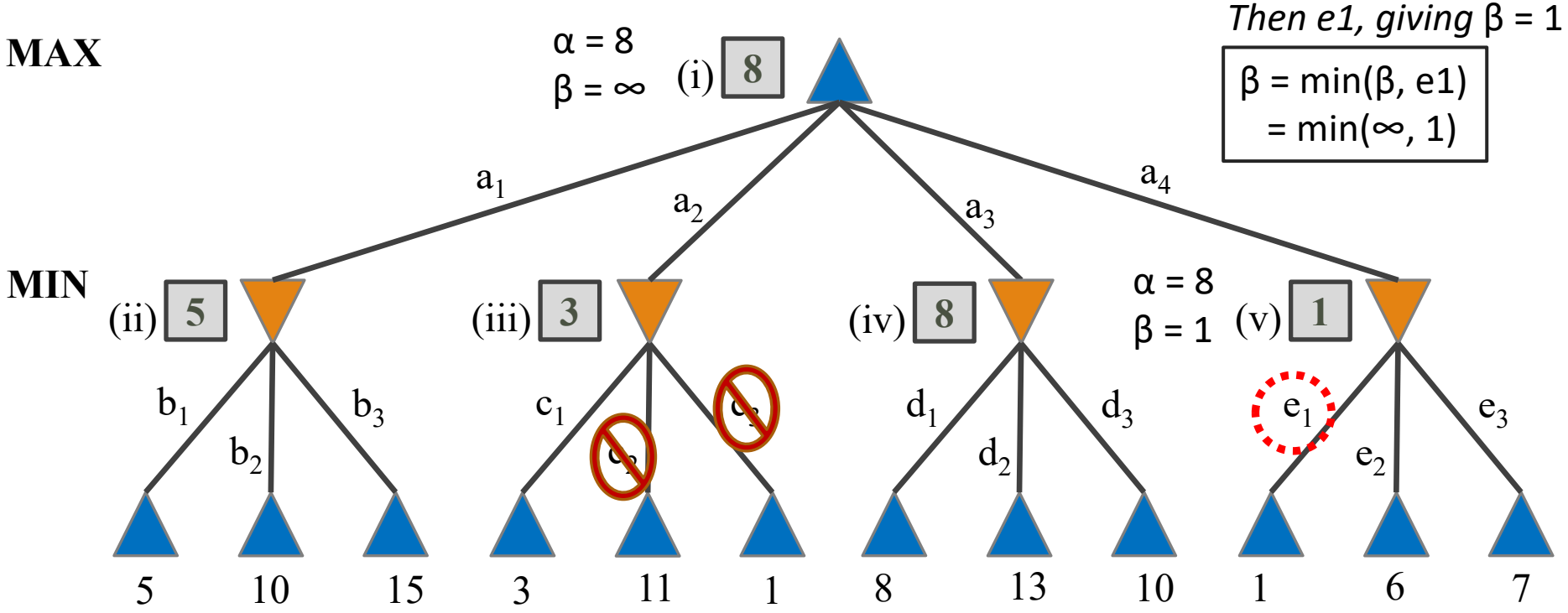

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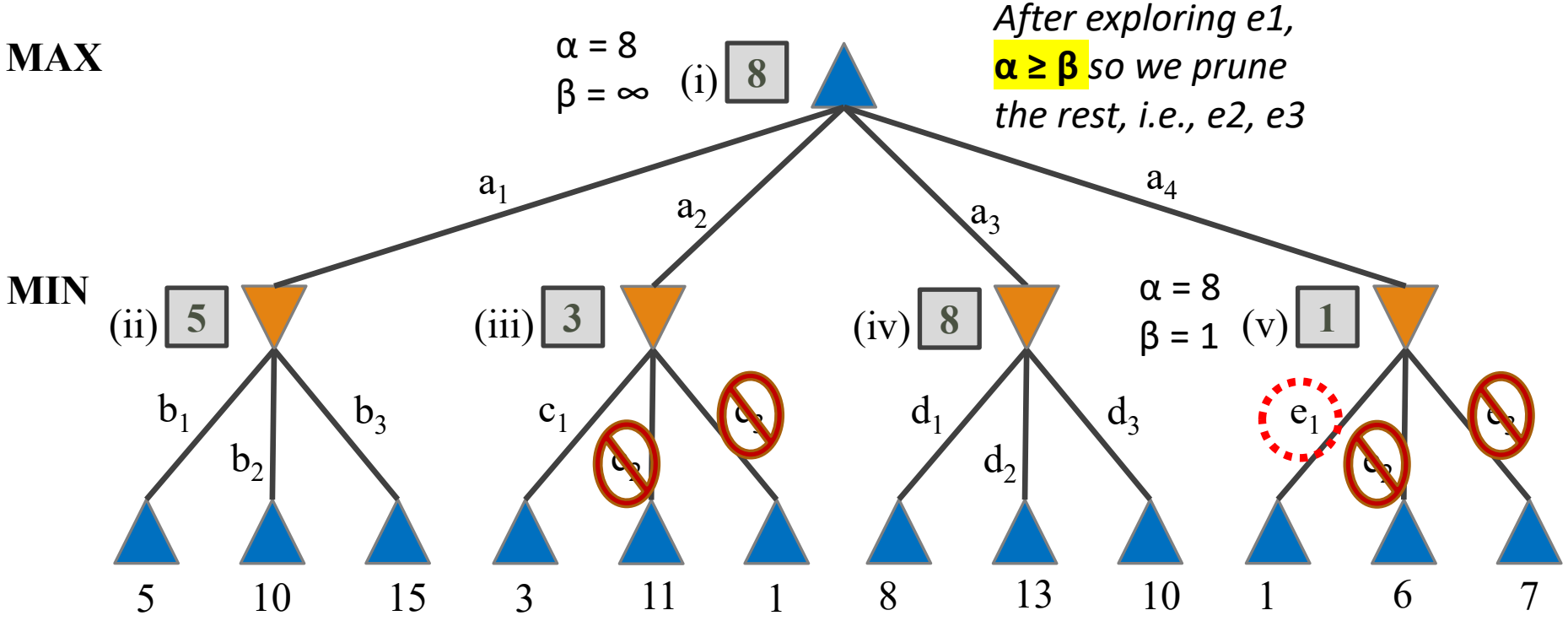

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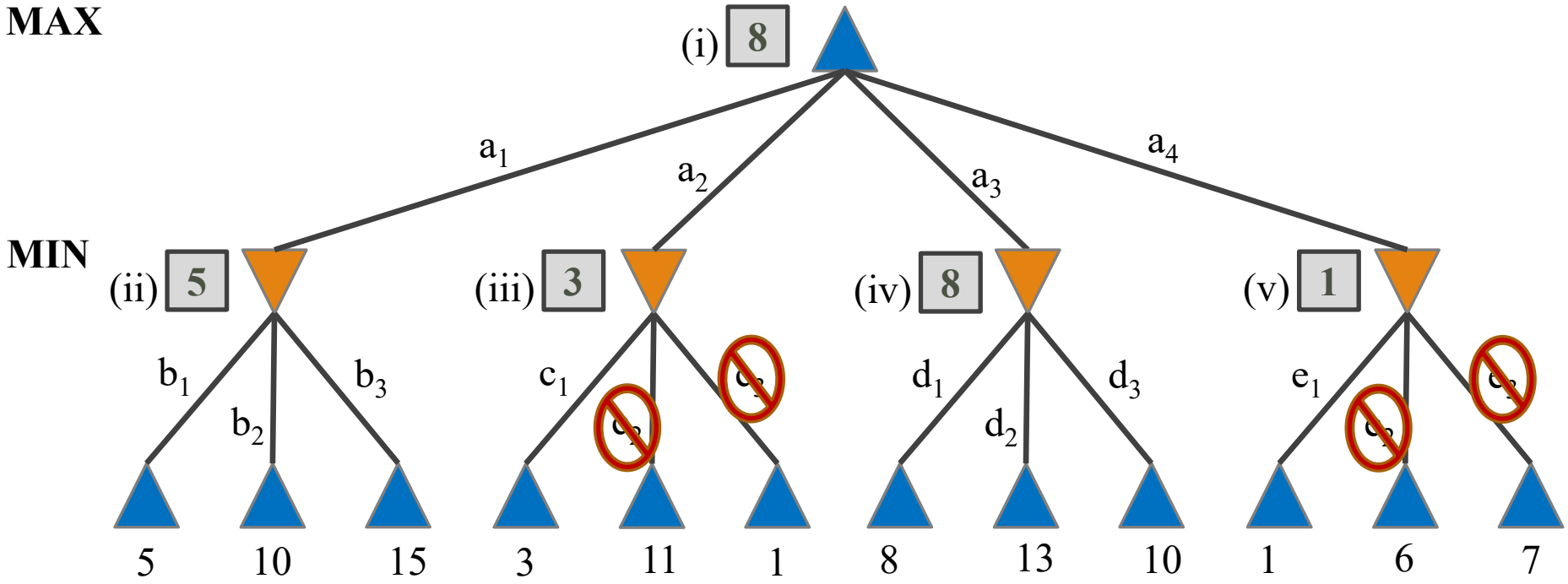

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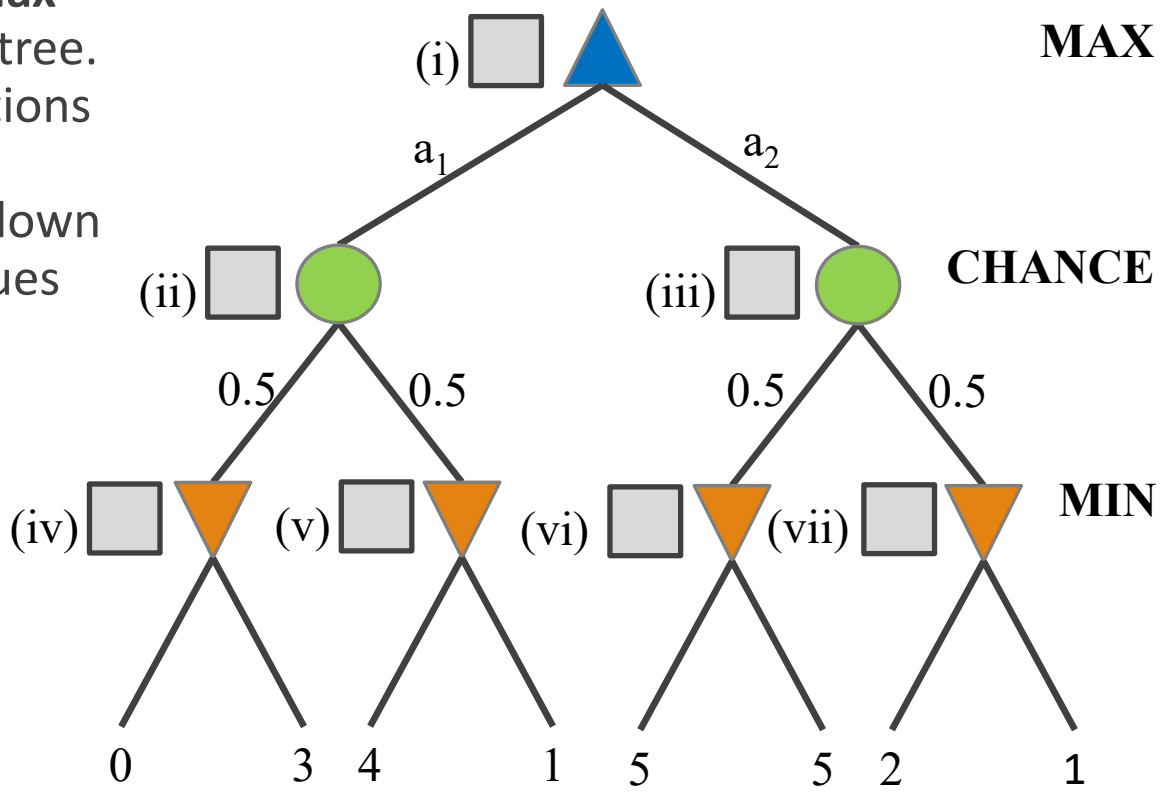

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  - Solution: a2