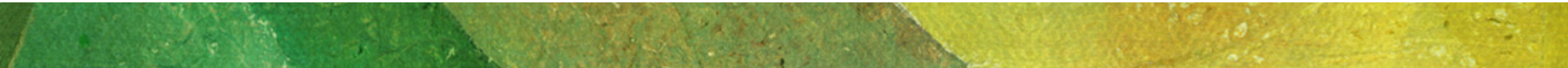
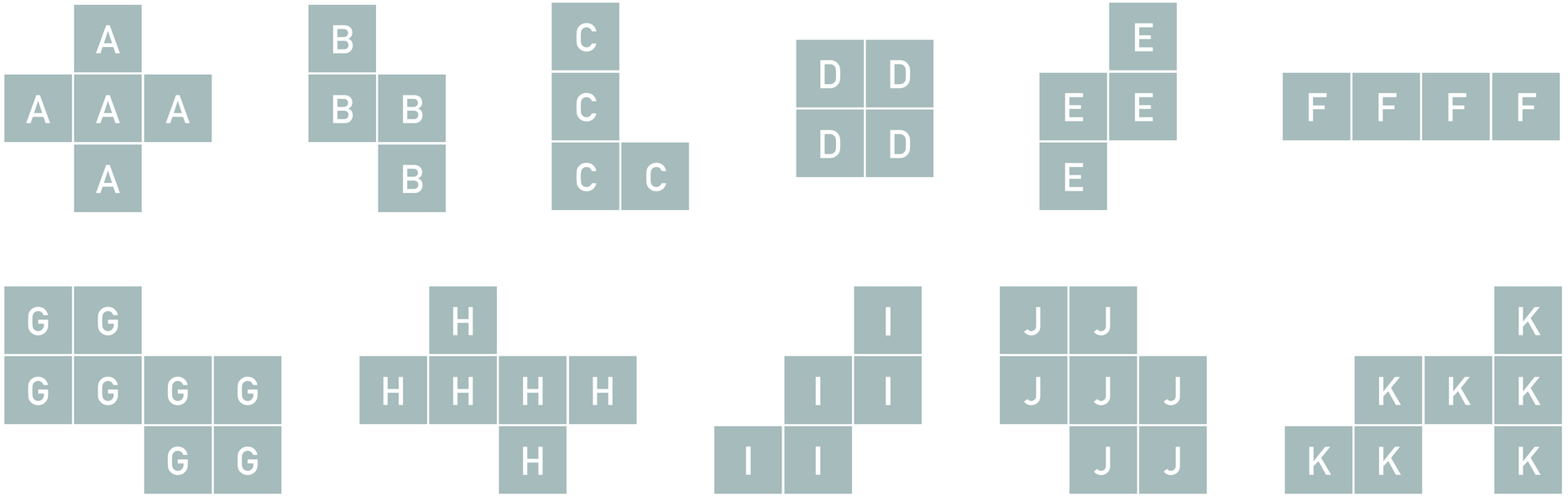
R-Trees

NDBI007: Assignment 5



Task 1

- Insert the following 11 elements arbitrarily into a node with dimensions $a = \langle 8,14 \rangle$, $b = \langle 8,14 \rangle$, $a \neq b$
  - Elements can be rotated and overlapped freely
  - You will use this node in the following tasks



- **Points:** 0

Task 2: Guttman's Split

- Split the overflown node with *Guttman's method*
  - The maximum number of items in a node is $M = 10$
  - The minimum number of items in a node is $m = \langle 3,5 \rangle$
  - In the PickSeeds method, calculate the overall area, area of the elements, and dead space *only for the 4 selected most distant pairs* of elements
    - I.e., you do not need to consider all possible pairs of elements

- *Illustrate* all the steps of splitting a node and the result
- Or, you may *implement* the algorithm *and log* all events (i.e., submit the source code and, e.g., makefile)
  - The permitted languages are Java, Python, C, C++, and Swift

- **Points:** 2

Task 3: Greene's Split

- Split the overflown node with *Greene's method*
  - The maximum number of items in a node is $M = 10$
  - The minimum number of items in a node is $m = \langle 3,5 \rangle$
  - In the PickSeeds method, calculate the overall area, area of the elements, and dead space *only for the 4 selected most distant pairs* of elements
    - I.e., you do not need to consider all possible pairs of elements

- *Illustrate* all the steps of splitting a node and the result
- Or, you may *implement* the algorithm *and log* all events (i.e., submit the source code and, e.g., makefile)
  - The permitted languages are Java, Python, C, C++, and Swift

- **Points:** 1.5

Task 4: Splitting In R* Tree

- Split the overflown node with *R* Tree split method*
  - The maximum number of items in a node is $M = 10$
  - The minimum number of items in a node is $m = \langle 3,5 \rangle$

- *Illustrate* all the steps of splitting a node and illustrate the result
- Or, you may *implement* the algorithm *and log* all events (i.e., submit the source code and, e.g., makefile)
  - The permitted languages are Java, Python, C, C++, and Swift

- **Points:** 1.5

Bonus Task 5

- *Compare* the individual *methods* of splitting of an overflown node
  - I.e., Guttman's, Greene's, and R* Tree split
  - What are the *advantages* and *disadvantages*?
  - What *effect* do they have on the *height* or *occupancy* of the R(*) tree?

- **Points:** 1