CSD2181/2183 – Data Structure

Exercises

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Introduction – Data Structure Exercises

- Purpose: to reinforce what you have learned and practiced in lectures.
- The exercise session is conducted face to face in class.
- It consists of a few MCQs to be solved within class.
- Limited time is given for each question (answer will be discussed afterwards).
- You are required to login to ClassPoint with your student ID.
- So, bring along your laptop or devices with Internet access.
- Attendance is compulsory and there is no make up.
- Exercises are marked considering your overall performance in the module.

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Exercise
Graphs

Exercise 9 – Graphs

9.1 All tree are graphs

A. True
B. False

Multiple Choice

Exercise 9 – Graphs

9.1 All tree are graphs

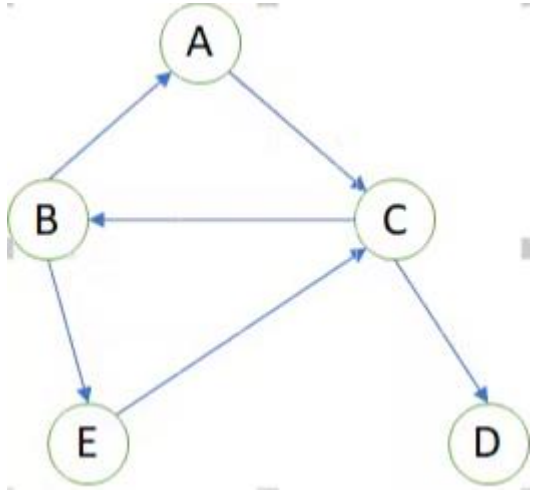
A. True
B. False

Tree is a special kind of graph (Trees are much simpler).

Exercise 9 – Graphs

9.2 What is length of path from A to E?

A. 1
B. 2
C. 3
D. 4



Multiple Choice

Exercise 9 – Graphs

9.2 What is length of path from A to E?

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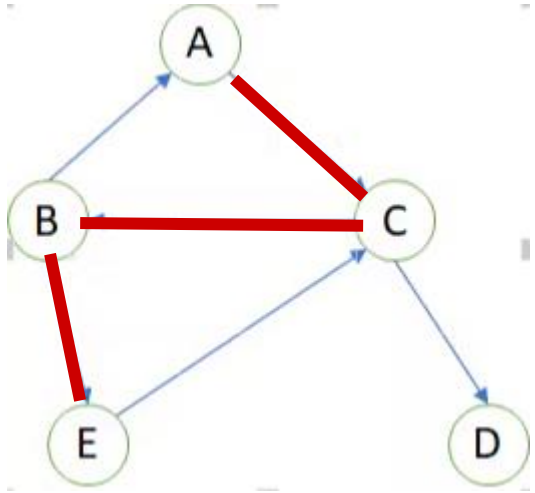
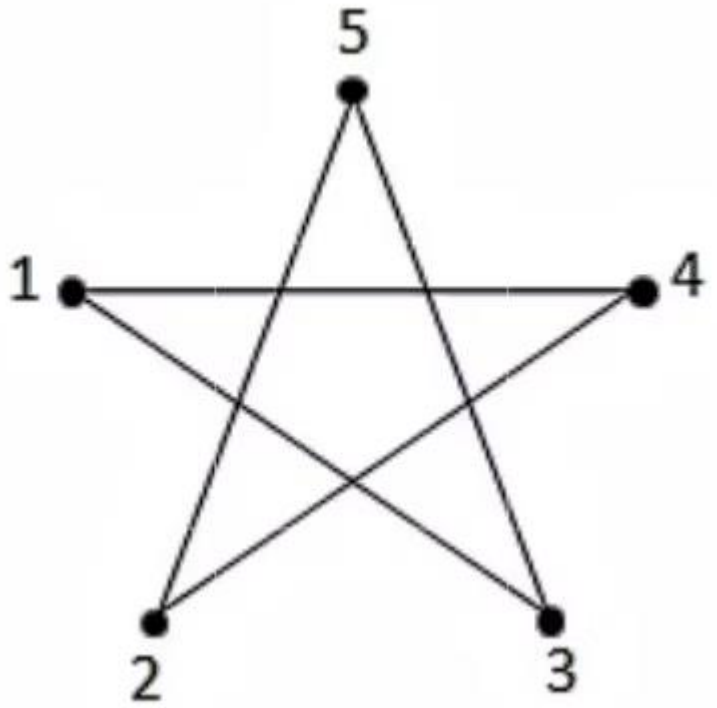


Exercise 9 – Graphs

9.3 Who are the neighbors of vertex '2'?

A. 1, 3, 4 and 5
B. 4 and 1
C. 1 and 3
D. 4 and 5



Multiple Choice

Exercise 9 – Graphs

9.3 Who are the neighbors of vertex '2'?

A. 1, 3, 4 and 5
B. 4 and 1
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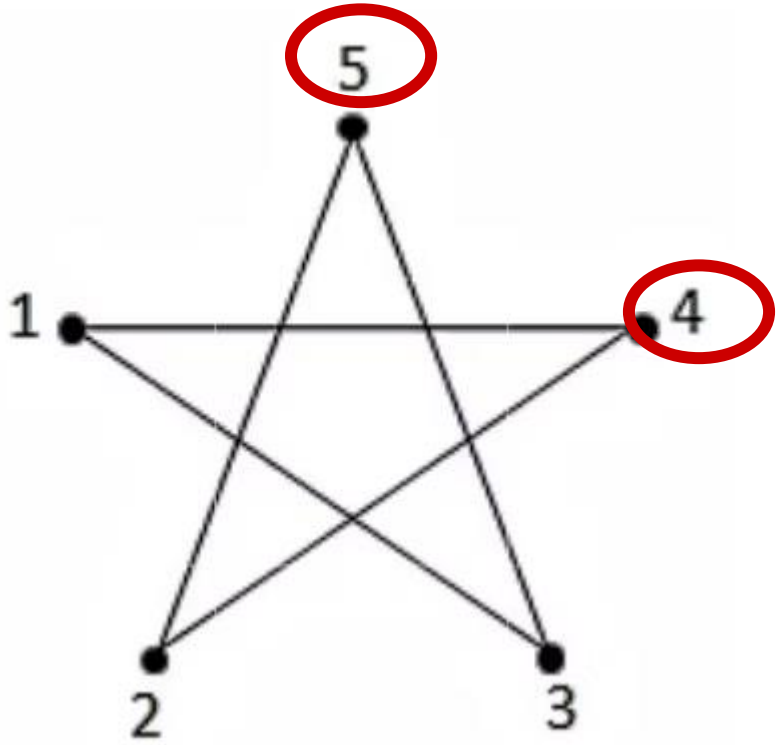
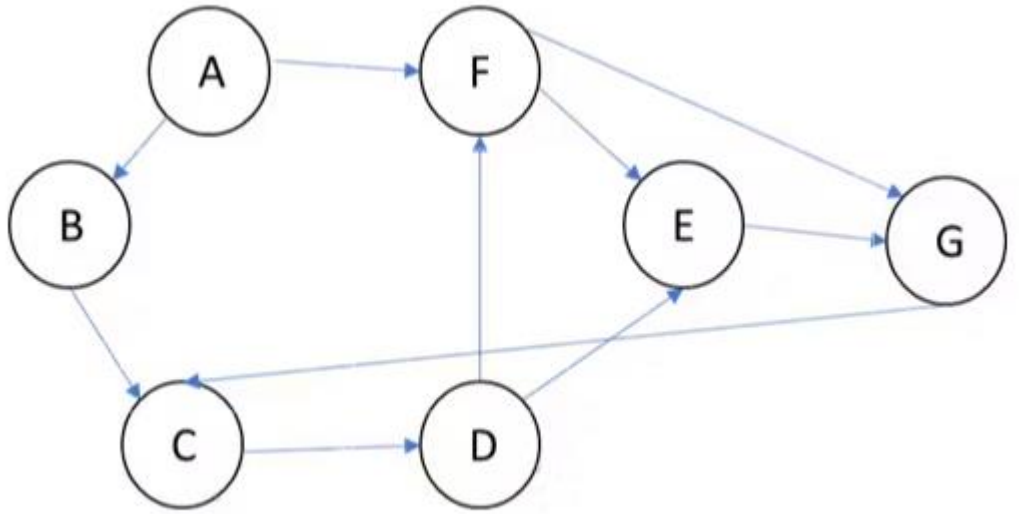


Direct edges from vertex 2 to vertex 4 and vertex 5

Exercise 9 – Graphs

9.4 What are the first 4 nodes if you perform Breadth First Traversal starting from vertex A

A. ABCD
B. ABFC
C. AFEG
D. AFCD



Multiple Choice

Exercise 9 – Graphs

9.4 What are the first 4 nodes if you perform Breadth First Traversal starting from vertex A

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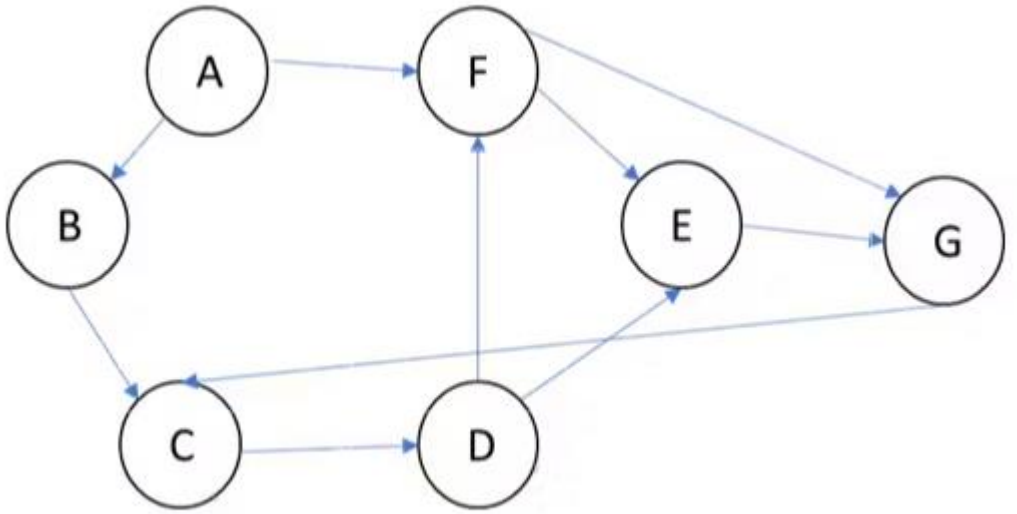


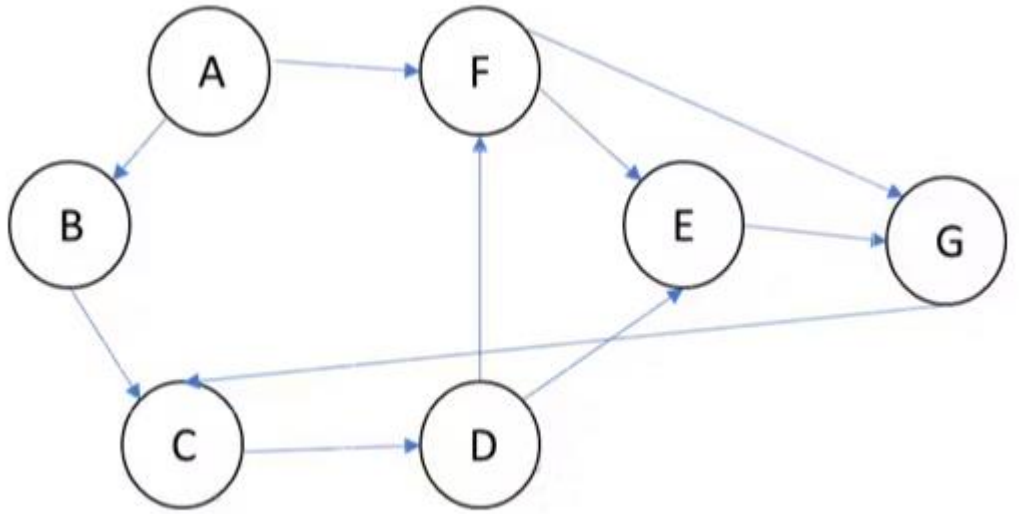
Container is a Queue:

A, BF, FC, CEG, …….

Exercise 9 – Graphs

9.5 What are the first 4 nodes if you perform Depth First Traversal starting from vertex A

A. ABCD
B. ABFC
C. AFEG
D. AFCD



Multiple Choice

Exercise 9 – Graphs

9.5 What are the first 4 nodes if you perform Depth First Traversal starting from vertex A

A. ABCD
B. ABFC
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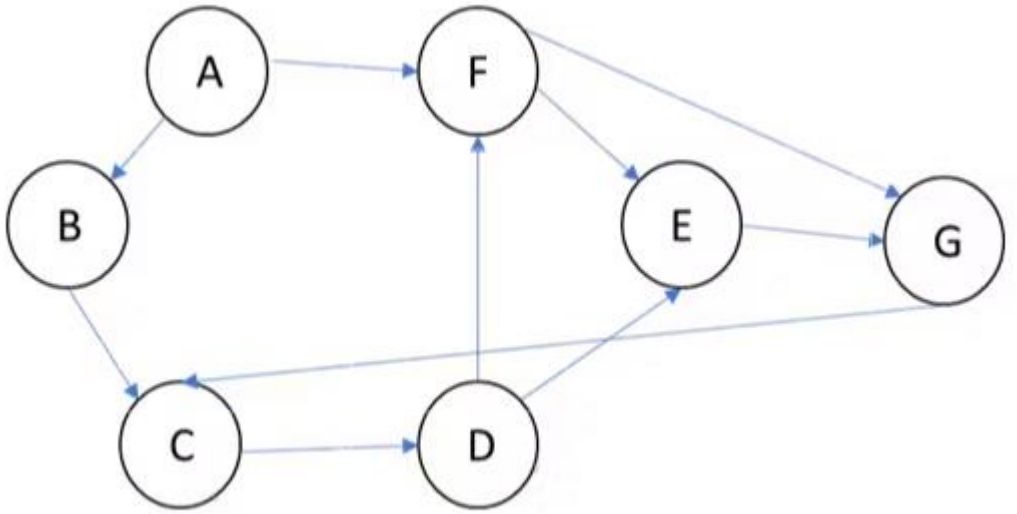

Container is a Stack:

A, BF, BGE, BGG,BGC,BGD,BGEF …….

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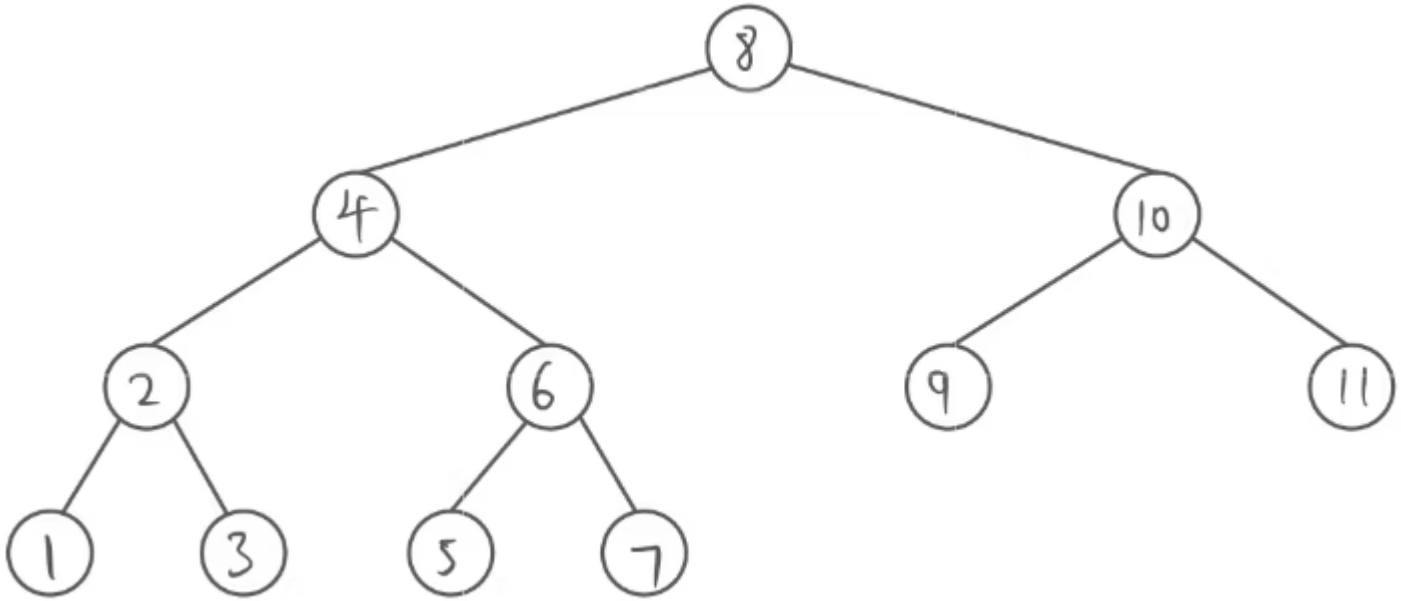
Exercise
Heaps

Exercise 9 – Heaps

9.6 Is this a valid heap?

A. Yes
B. No

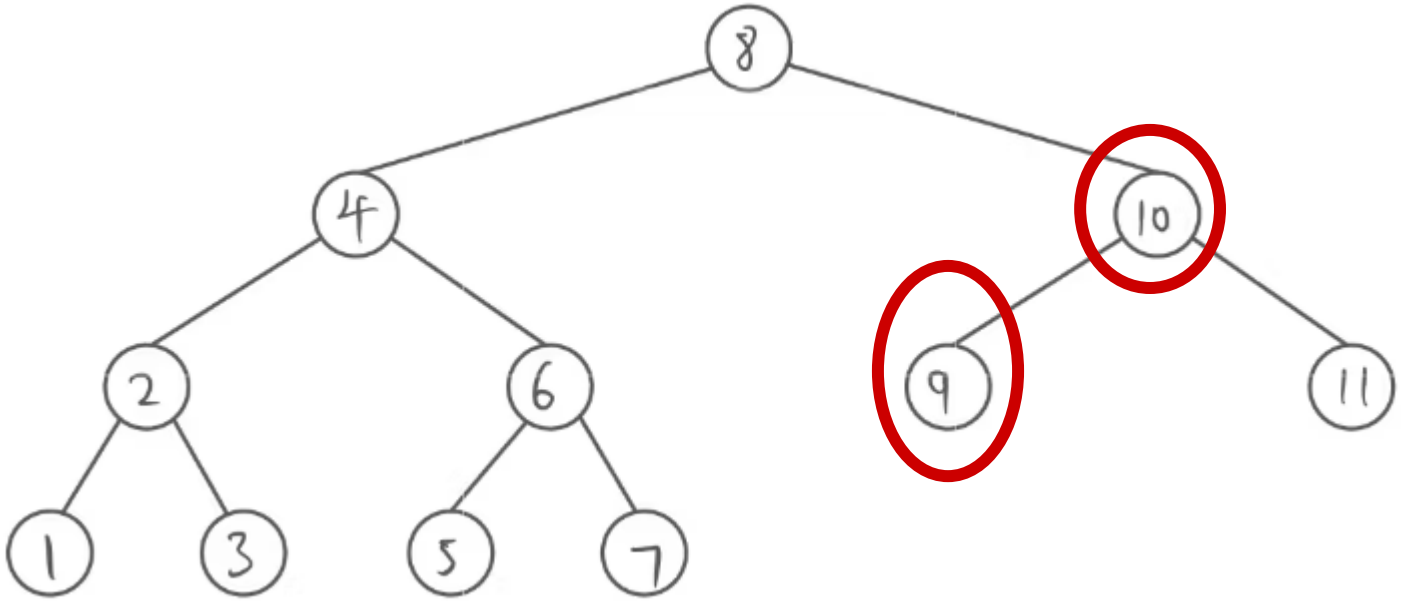


Multiple Choice

Exercise 9 – Heaps

9.6 Is this a valid heap?

A. Yes
B. No

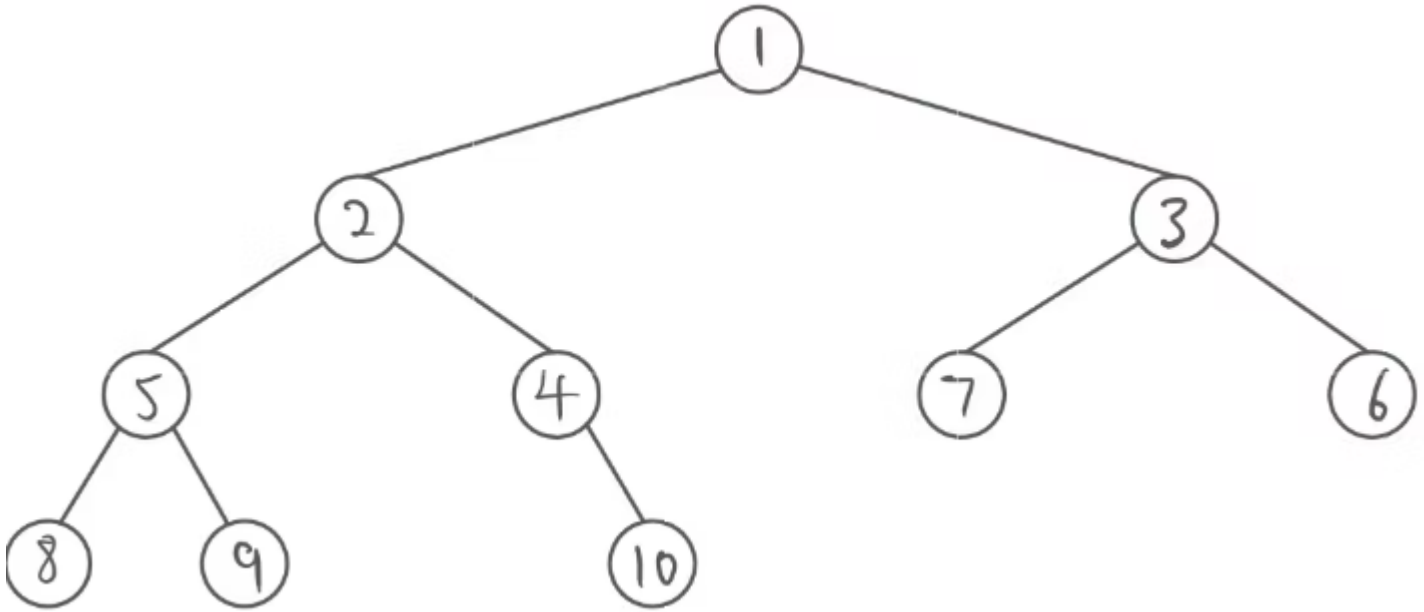


Order: every non-root node X, the value in the parent of X is less than (or equal to) the value in X. (MinHeap)

Exercise 9 – Heaps

9.7 Is this a valid heap?

A. Yes
B. No

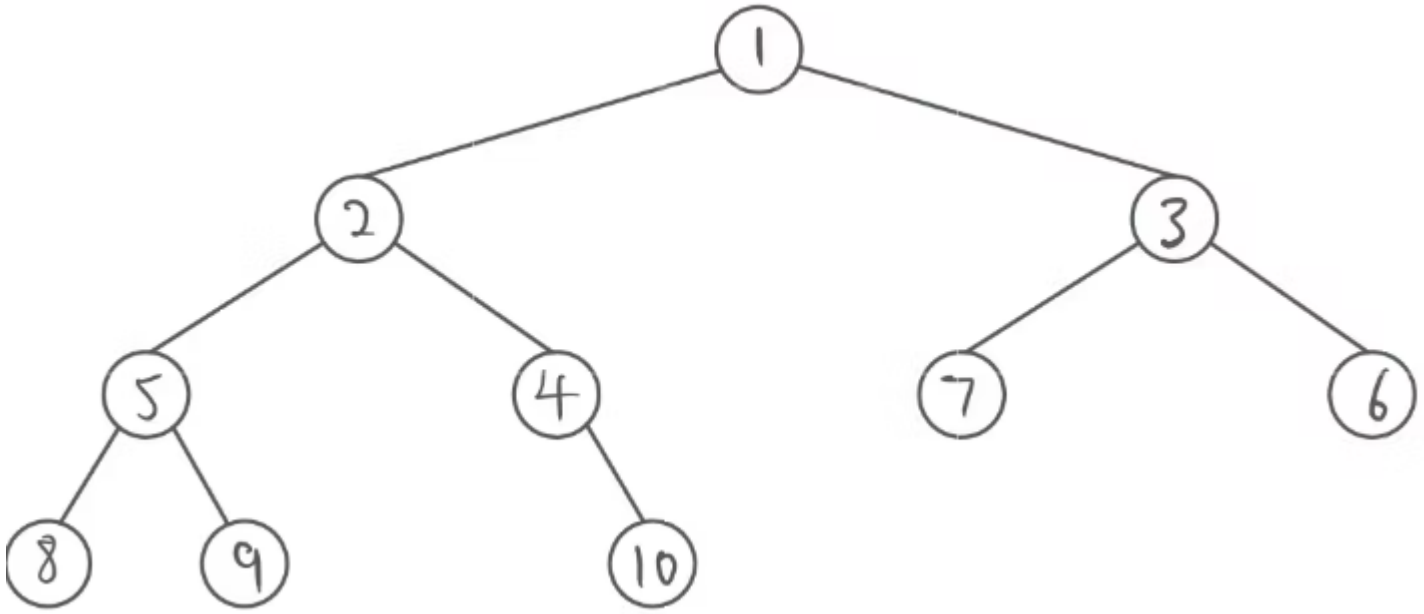


Multiple Choice

Exercise 9 – Heaps

9.7 Is this a valid heap?

A. Yes
B. No

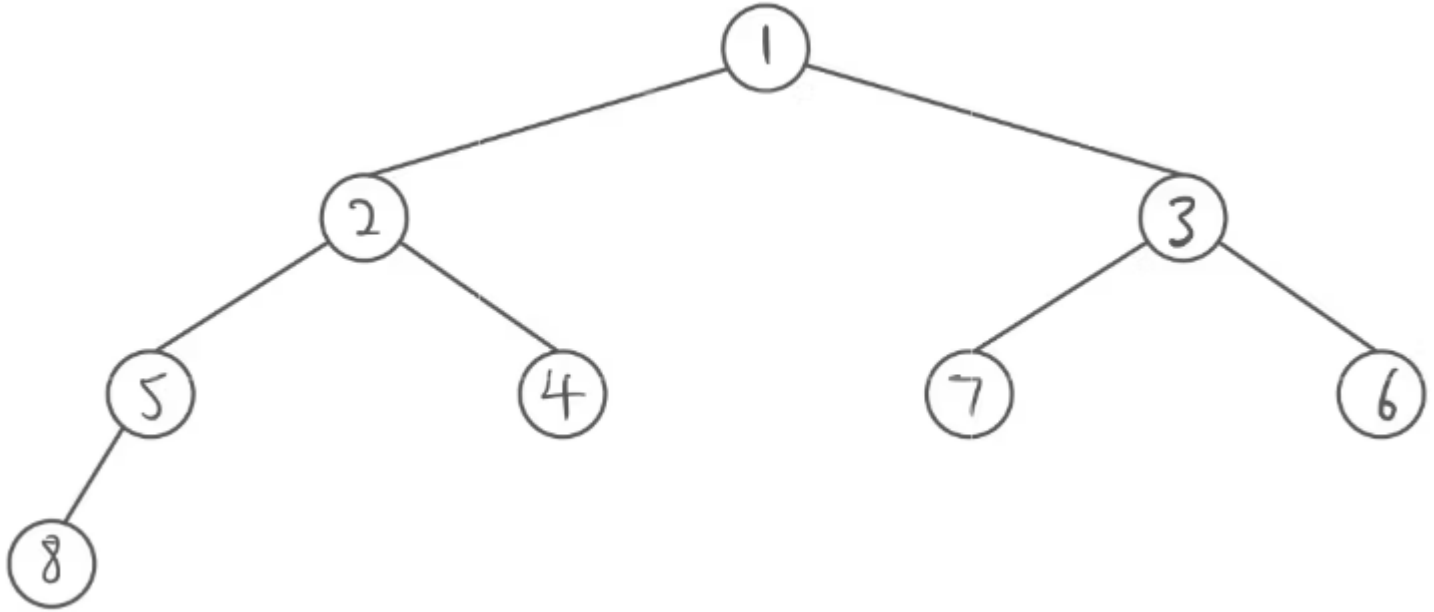


Structure: Complete Binary Tree

Exercise 9 – Heaps

9.8 Is this a valid heap?

A. Yes
B. No

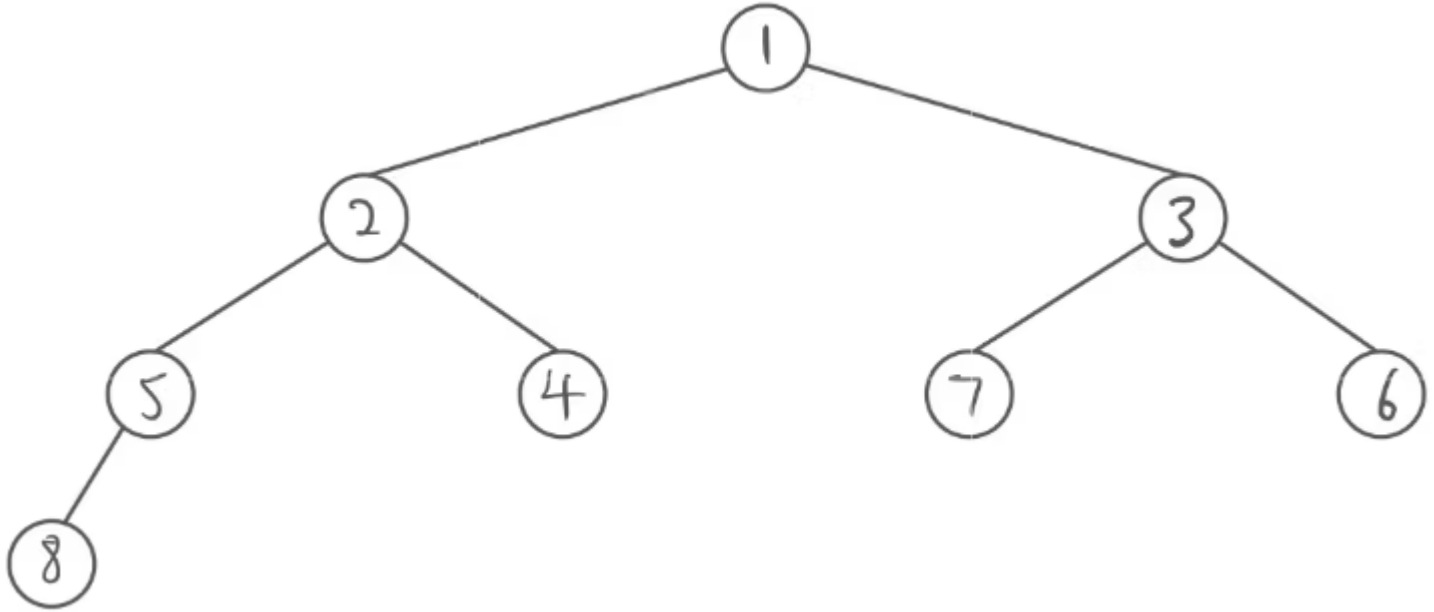


Multiple Choice

Exercise 9 – Heaps

9.8 Is this a valid heap?

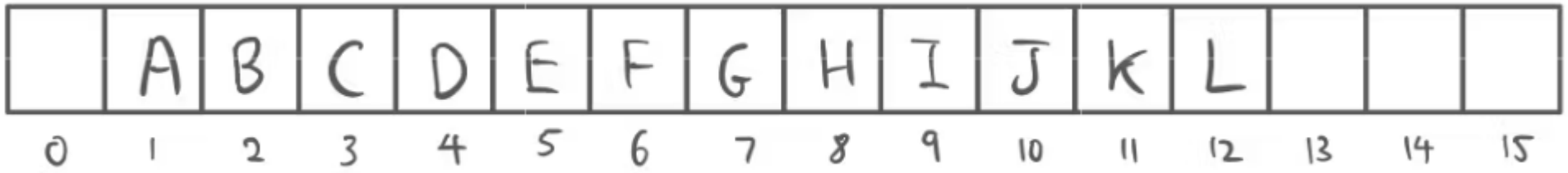
A. Yes
B. No



Exercise 9 – Heaps

9.9 What is the left child of B?

A. A
B. C
C. D
D. E
E. F
F. G



Multiple Choice

Exercise 9 – Heaps

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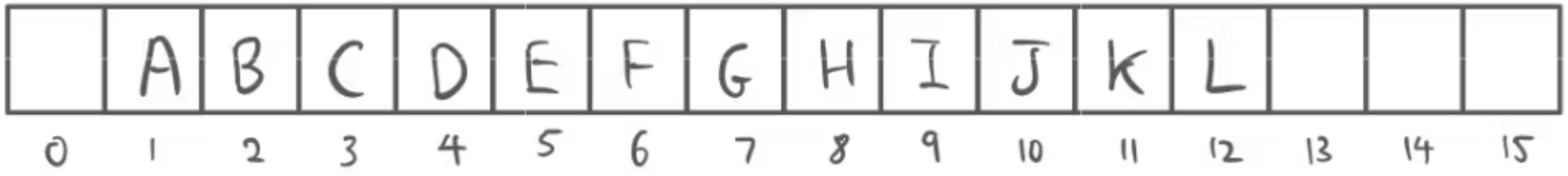


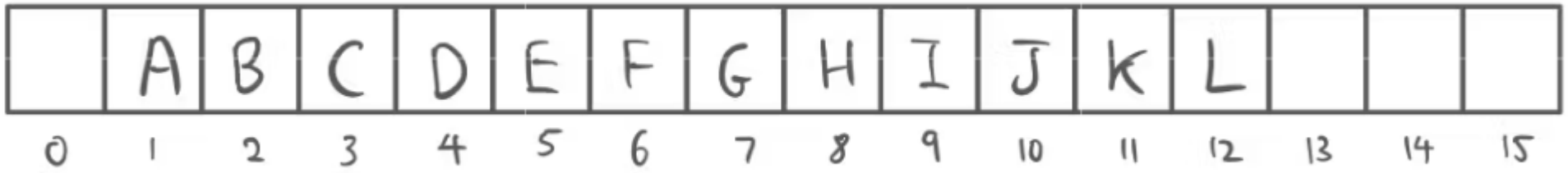
From node i:

left child: 2*i

Exercise 9 – Heaps

9.10 What is the right child of E?

A. F
B. G
C. J
D. K
E. L
F. Null



Multiple Choice

Exercise 9 – Heaps

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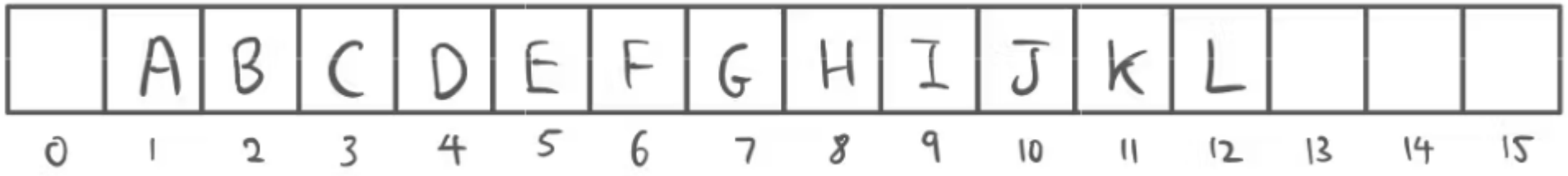
A. F
B. G
C. J
D. K
E. L
F. Null

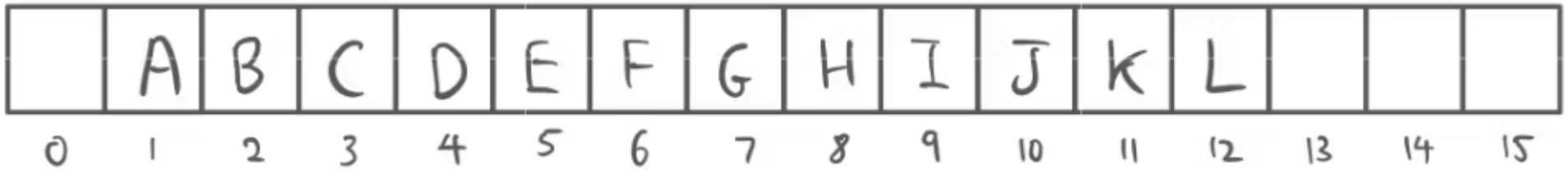


From node i:
right child: 2*i+1

Exercise 9 – Heaps

9.11 What is the parent of I?

A. C
B. D
C. E
D. F
E. G
F. H



Multiple Choice

Exercise 9 – Heaps

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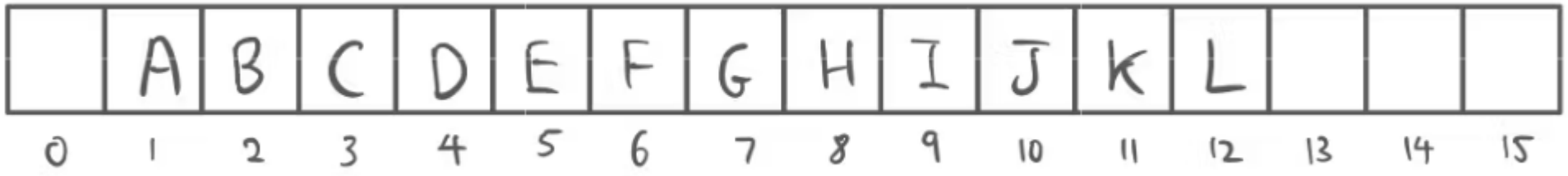
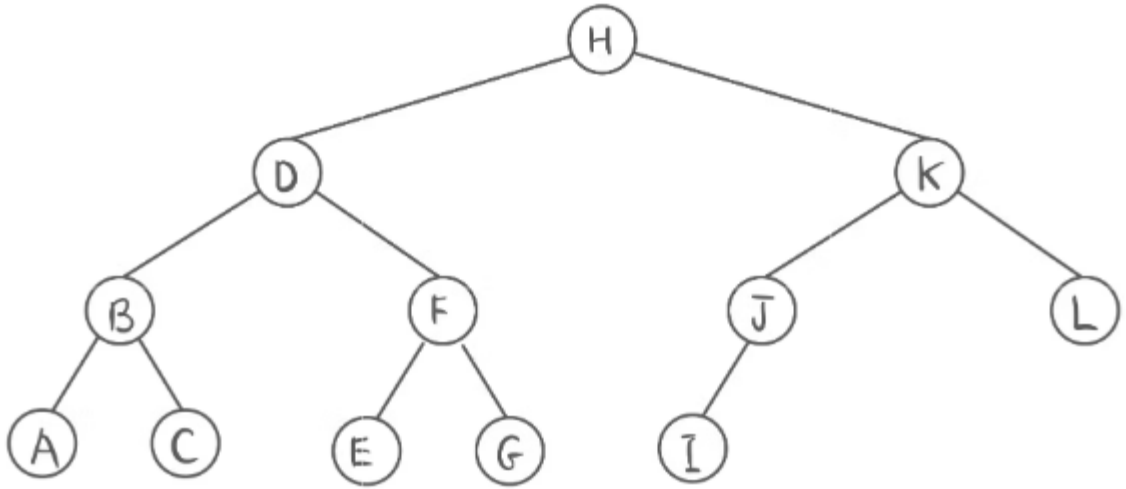


From node i:
parent: i/2

Exercise 9 – Heaps

9.12 What is arr_[4]

A. A
B. B
C. C
D. E
E. E
F. F

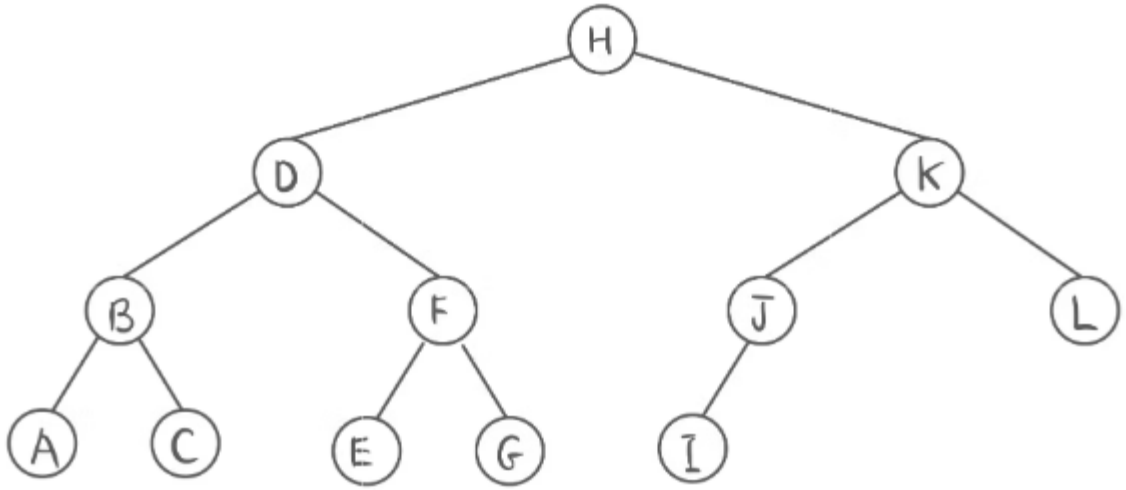


Multiple Choice

Exercise 9 – Heaps

9.12 What is arr_[4]

A. A
B. B
C. C
D. E
E. E
F. F

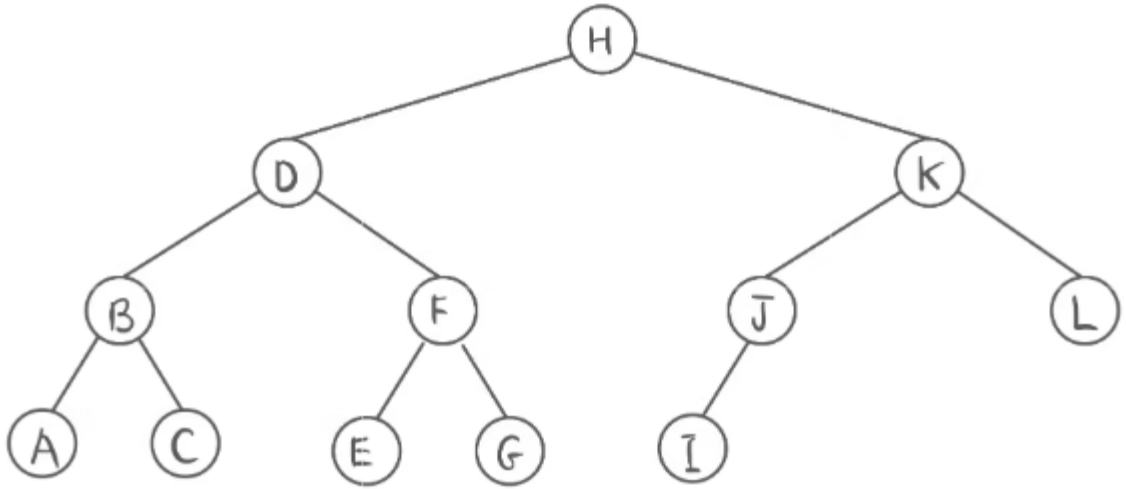


	H	D	K	B	F	J	L	A	C	E	G	I	
0	1	2	3	4	5	6	7	8	9	10	11	12	13

Exercise 9 – Heaps

9.13 What is arr_[8]

A. A
B. B
C. C
D. E
E. E
F. F

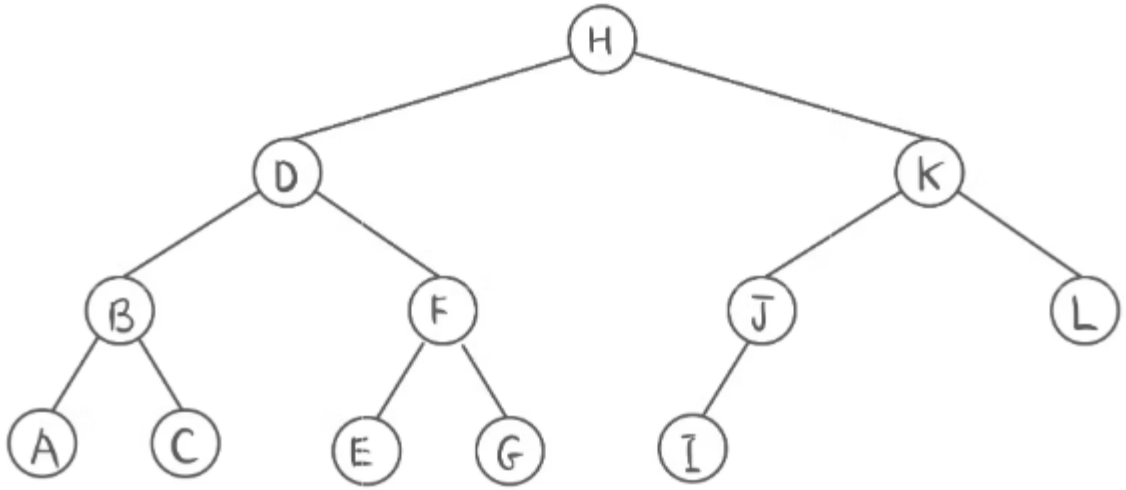


Multiple Choice

Exercise 9 – Heaps

9.13 What is arr_[8]

A. A
B. B
C. C
D. E
E. E
F. F

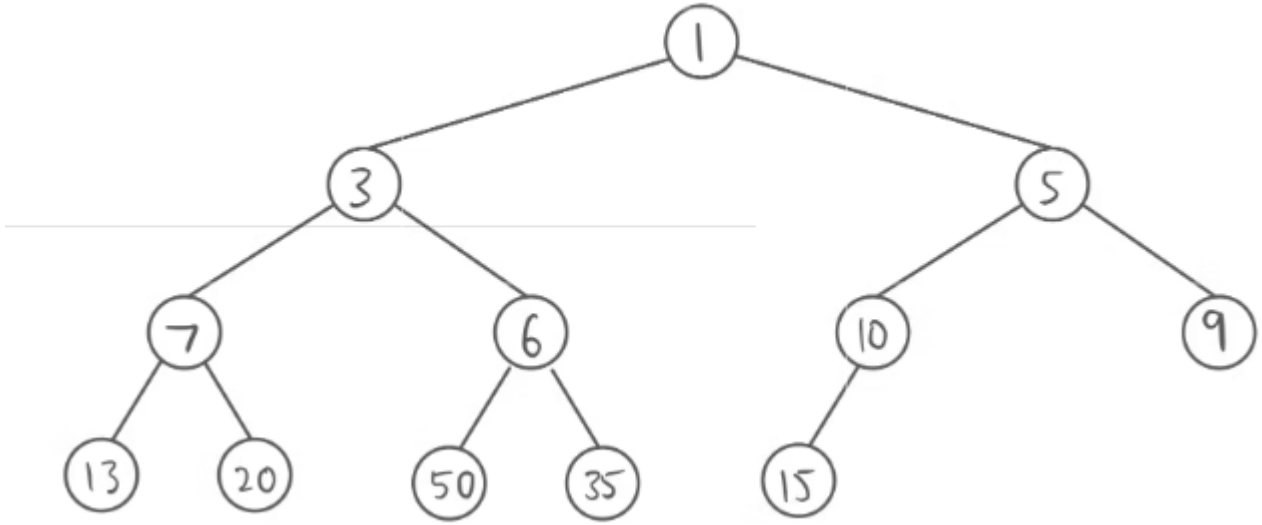


	H	D	K	B	F	J	L	A	C	E	G	I	
0	1	2	3	4	5	6	7	8	9	10	11	12	13

Exercise 9 – Heaps

9.14 How many swaps after Heap::insert(2)?

A. 0
B. 1
C. 2
D. 3
E. 4
F. 5



Multiple Choice

Exercise 9 – Heaps

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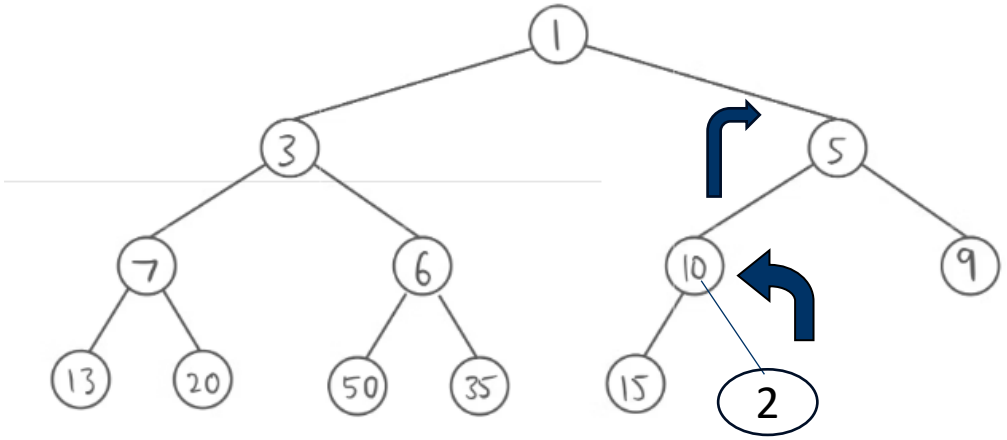
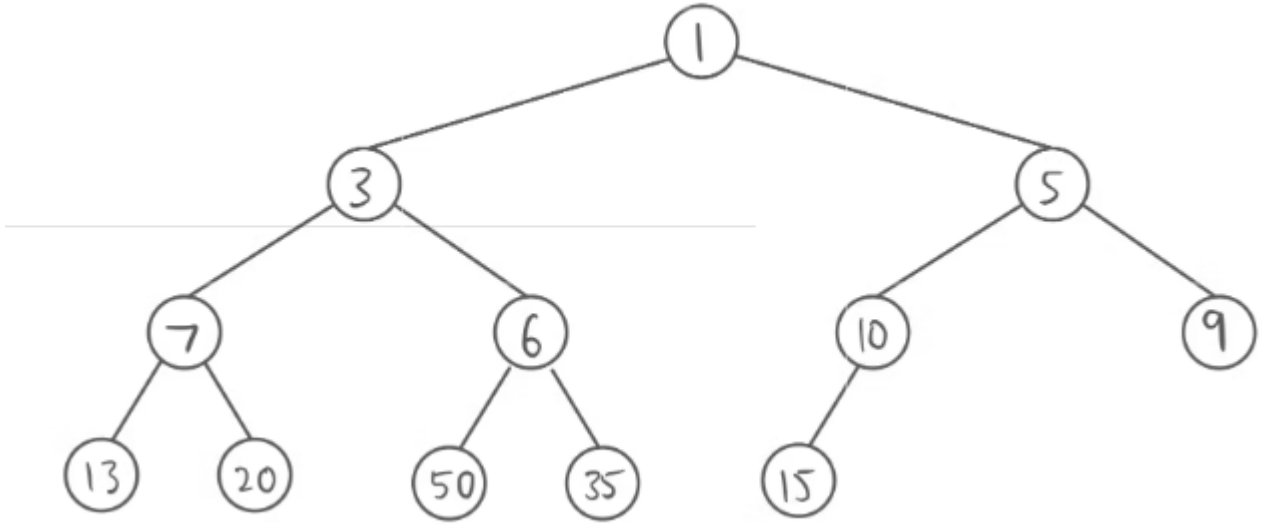


Exercise 9 – Heaps

9.15 Where will 8 be after Heap::insert(8)?

A. arr_[1]
B. arr_[2]
C. arr_[3]
D. arr_[4]
E. arr_[5]
F. arr_[6]



Multiple Choice

Exercise 9 – Heaps

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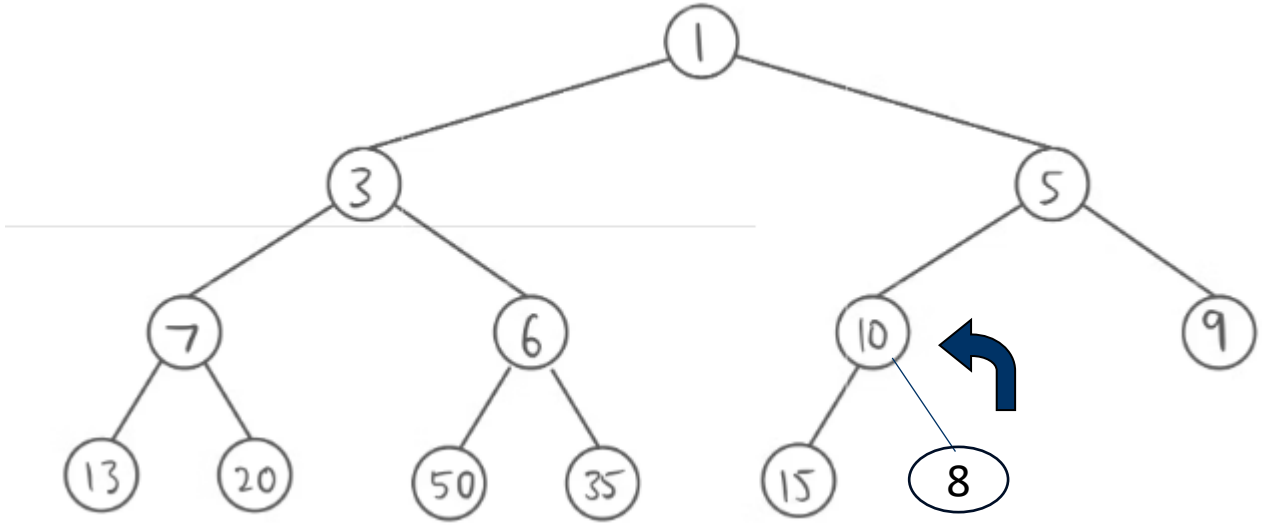
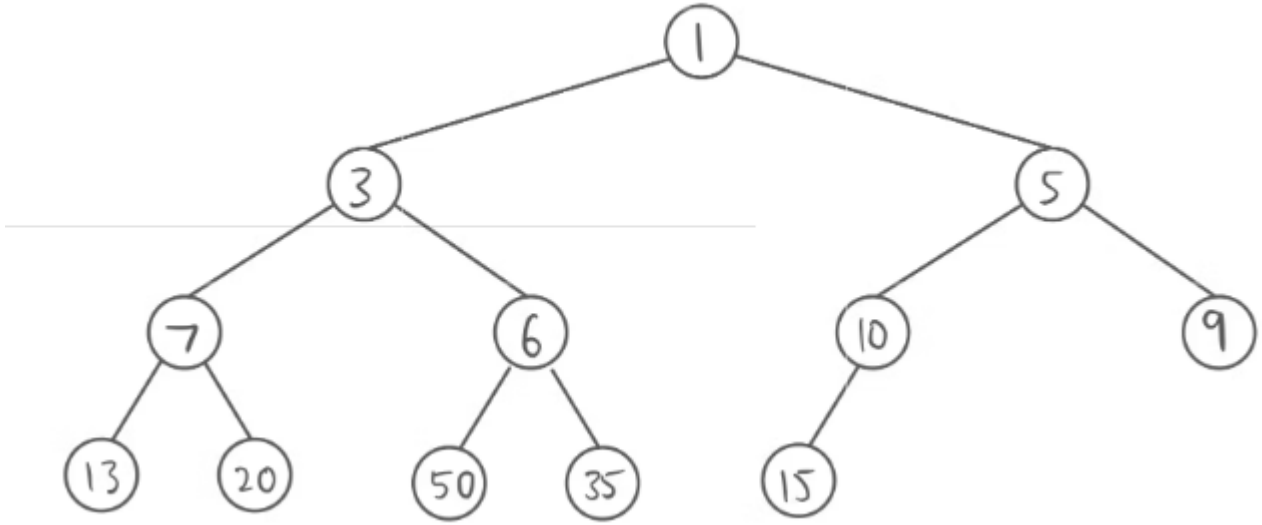


Exercise 9 – Heaps

9.16 How many nodes will have changed after Heap::delete()?

A. 0
B. 1
C. 2
D. 3
E. 4
F. 5



Multiple Choice

Exercise 9 – Heaps

9.16 How many nodes will have changed after Heap::delete()?

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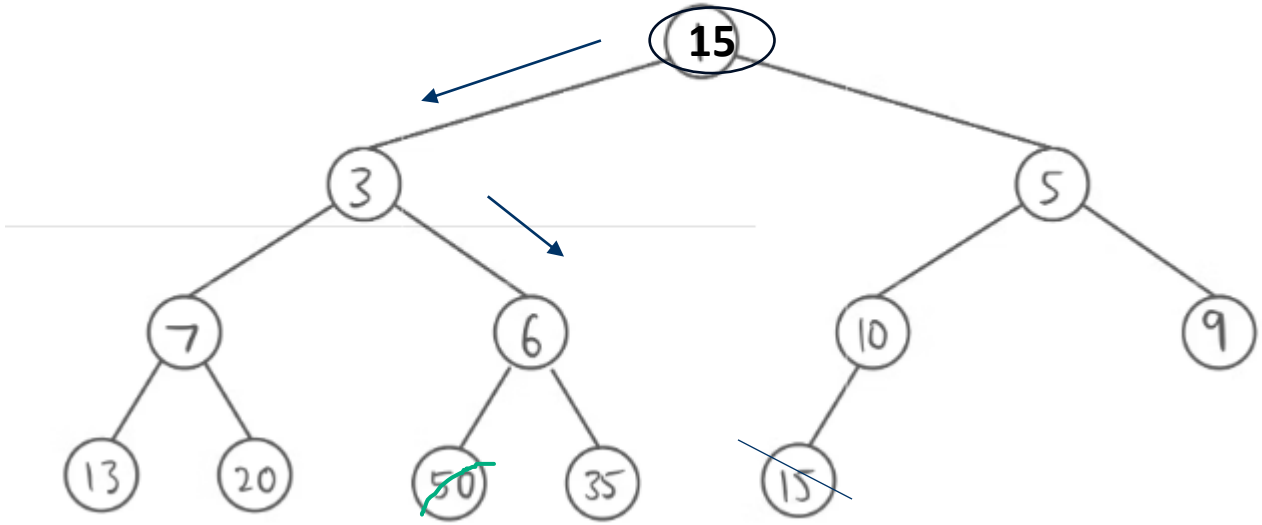

Noes 3, 6 ,15

Exercise 9 – Heaps

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9.17 What is the worst case time complexity of Heap::pop()?

A. O(1)
B. O(logn)
C. O(n)
D. O(nlogn)
E. O(n^2)

Multiple Choice

Exercise 9 – Heaps

9.17 What is the worst case time complexity of Heap::pop()?

A. O(1)
B. O(logn)
C. O(n)
D. O(nlogn)
E. O(n^2)

Exercise 9 – Heaps

9.18 Given 15, 4, 13, 2, 11, 8, 7, 5, 6, 1 create a heap using Floyd's method. Where will 8 be before the build heap method is called?

A. arr_[10]
B. arr_[7]
C. arr_[8]
D. arr_[4]
E. arr_[5]
F. arr_[6]

Multiple Choice

Exercise 9 – Heaps

9.18 Given 15, 4, 13, 2, 11, 8, 7, 5, 6, 1 create a heap using Floyd's method. Where will 8 be before the build heap method is called?

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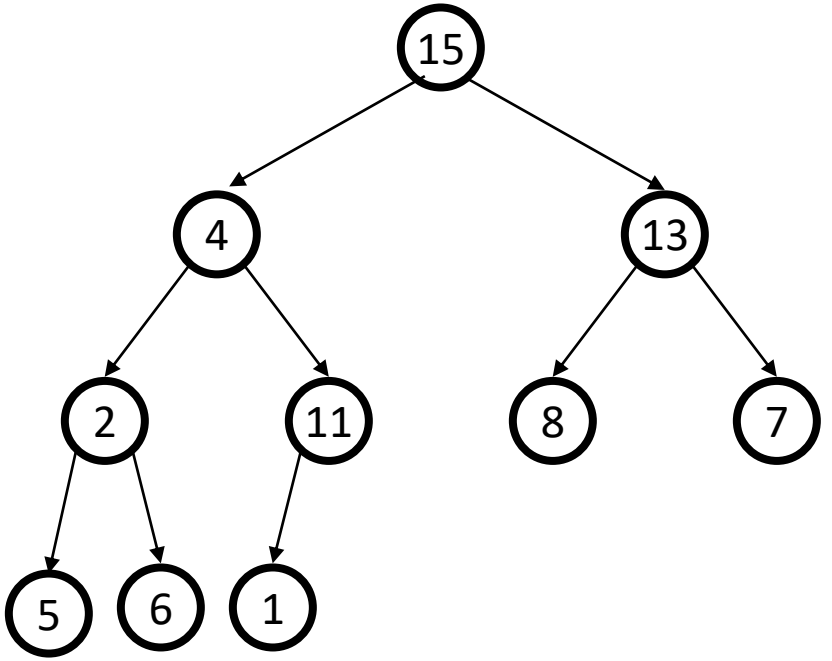

Exercise 9 – Heaps

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9.19 Given 15, 4, 13, 2, 11, 8, 7, 5, 6, 1 create a heap using Floyd's method. Where will 15 be after the build heap method is called?

A. arr_[10]
B. arr_[7]
C. arr_[8]
D. arr_[4]
E. arr_[5]
F. arr_[6]

Multiple Choice

Exercise 9 – Heaps

9.19 Given 15, 4, 13, 2, 11, 8, 7, 5, 6, 1 create a heap using Floyd's method. Where will 15 be before the build heap method is called?

A. arr_[10]
B. arr_[7]
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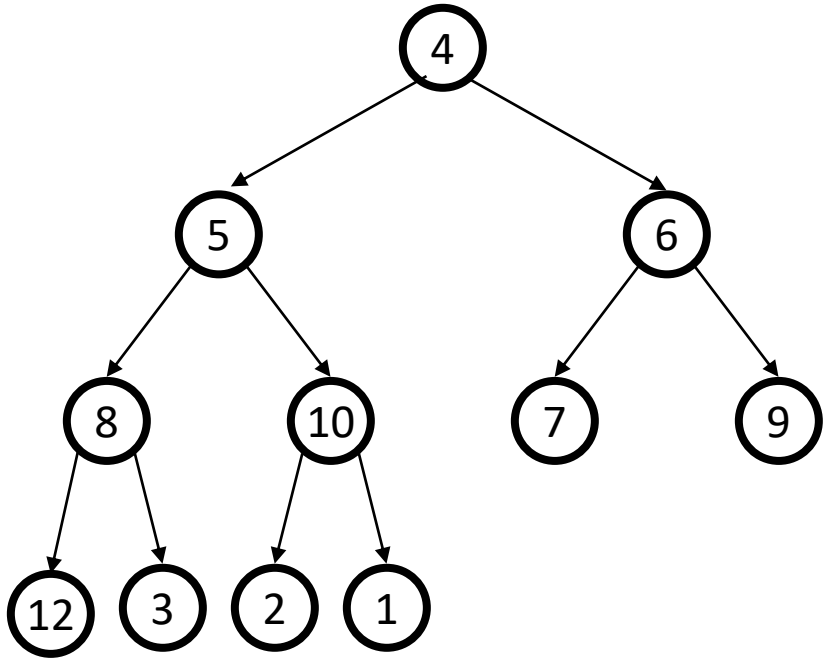
D. arr_[4]
E. arr_[5]
F. arr_[6]

Exercise 9 – Heaps

9.20 You are in the 4th iteration of the Heap sort loop. Root will be replaced with which node?

A. 10
B. 12
C. 3
D. 2
E. 1



Multiple Choice

Exercise 9 – Heaps

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B. 12
C. 3
D. 2
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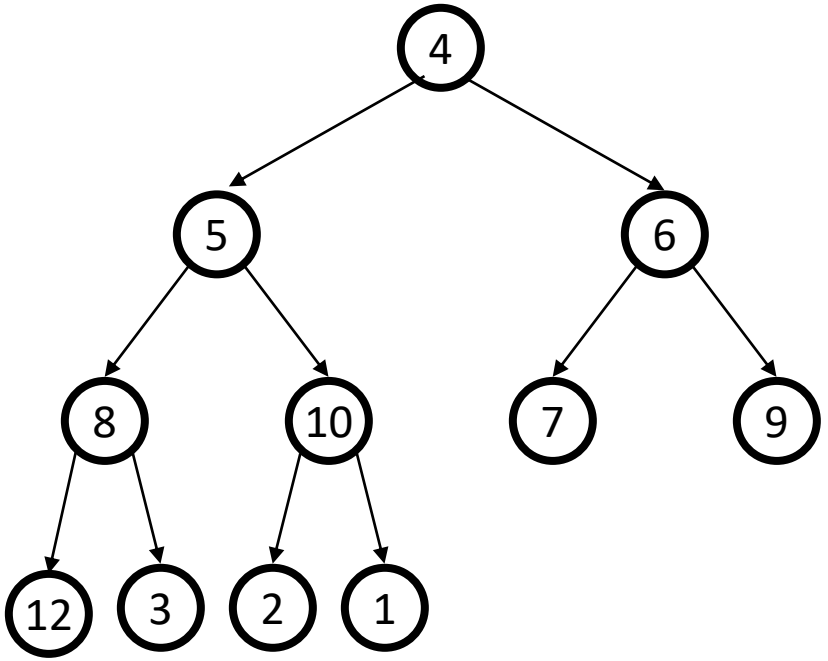

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The End