Quiz 1 - Sept 1, 2017

Q1. What is the memory footprint (size) of a Java **list node** (as seen in class)?

```
private class Node
{
    String item;
    Node next;
}
```

A. 4 bytes

B. 8 bytes

C. 12 bytes

D. 16 bytes

E. 32 bytes

Quiz 1 - Sept 1, 2017

Q2. Which of the following list operations can only be performed in **constant time** with a doubly-linked list?

A. Add element at beginning

B. Remove element at beginning

C. Add element at the end

D. Remove element at the end

E. C & D

Quiz 1 - Sept 1, 2017

Q3. Which of the following container types support(s) a **FIFO** insertion / removal policy?

A. Stack

B. **Queue**

C. Bag

D. B & C

E. A & B

Quiz 2 - Sept 15, 2017

Q1. Give, in **tilde** notation, the value of '**sum**' (as a function of N) at the end of following code fragment:

```
int sum = 0;
for (int i = 1; i < N; i *= 2)
   for (int j = 0; j < N ; j++)
      sum++;
```

A. N^2

B. $N^2/2$

C. N log N

D. 1/2 N log N

E. None of the above

Quiz 2 - Sept 15, 2017

Q2. Give, in **Θ** (Big Theta) notation, the value of '**sum**' (as a function of N) at the end of following code fragment:

```
int sum = 0;
for (int i = 1; i < N; i *= 2)
   for (int j = 0; j < i ; j++)
      sum++;
```

A. N^2

B. N log N

C. N

D. Log N

E. None of the above

Quiz 2 - Sept 15, 2017

Q3. What sorting algorithms correspond to the intermediate stages shown here?

A. Mrg, Ins, Sel, Sh, Mgr BU

B. Mrg BU, Sh, Sel, Ins, Mgr

C. Ins, Sh, Mrg, Sel, Mgr BU

D. Mrg BU, Ins, Mrg, Sel, Sh

E. None of the above

original	1	2	3	4	5	sorted
lifo	data	hash	data	data	data	data
fifo	fifo	fifo	exch	fifo	fifo	exch
data	lifo	data	fifo	find	find	fifo
type	type	link	find	hash	hash	find
hash	hash	leaf	hash	heap	heap	hash
heap	heap	heap	heap	lifo	lifo	heap
sort	link	exch	leaf	link	link	leaf
link	sort	node	left	list	list	left
list	find	lifo	less	push	push	less
push	list	left	lifo	root	root	lifo
find	push	find	link	sort	sort	link
root	root	path	list	type	type	list
leaf	leaf	list	sort	leaf	leaf	next
tree	null	next	tree	left	tree	node
null	path	less	null	node	null	null
path	tree	root	path	null	path	path
node	exch	sink	node	path	node	push
left	left	swim	type	tree	left	root
less	less	null	root	exch	less	sink
exch	node	sort	push	less	exch	sort
sink	next	type	sink	next	sink	swap
swim	sink	tree	swim	sink	swim	swim
next	swap	push	next	swap	next	tree
swap	swim	swap	swap	swim	swap	type

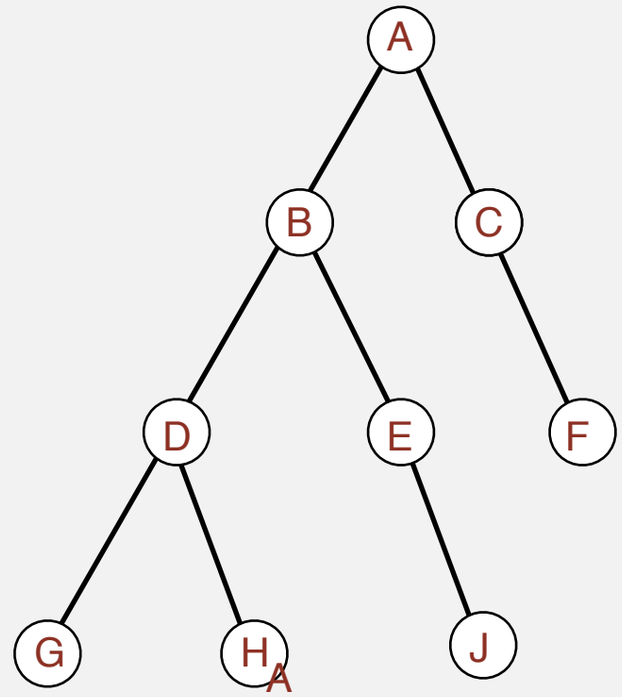
Quiz 2 - Sept 15, 2017

Q3.

original	Merge BU	Shellsort	Selection	Insertion	Merge	sorted
lifo	data	hash	data	data	data	data
fifo	fifo	fifo	exch	fifo	fifo	exch
data	lifo	data	fifo	find	find	fifo
type	type	link	find	hash	hash	find
hash	hash	leaf	hash	heap	heap	hash
heap	heap	heap	heap	lifo	lifo	heap
sort	link	exch	leaf	link	link	leaf
link	sort	node	left	list	list	left
list	find	lifo	less	push	push	less
push	list	left	lifo	root	root	lifo
find	push	find	link	sort	sort	link
root	root	path	list	type	type	list
leaf	leaf	list	sort	leaf	leaf	next
tree	null	next	tree	left	tree	node
null	path	less	null	node	null	null
path	tree	root	path	null	path	path
node	exch	sink	node	path	node	push
left	left	swim	type	tree	left	root
less	less	null	root	exch	less	sink
exch	node	sort	push	less	exch	sort
sink	next	type	sink	next	sink	swap
swim	sink	tree	swim	sink	swim	swim
next	swap	push	next	swap	next	tree
swap	swim	swap	swap	swim	swap	type

Quiz 3 - Sept 27, 2017

Q1. Which of the following options correspond to a **preorder** traversal of the binary tree shown on the right?



A. G D B A C F H E J

B. A B C D E F G H J

C. A B D G H E J C F

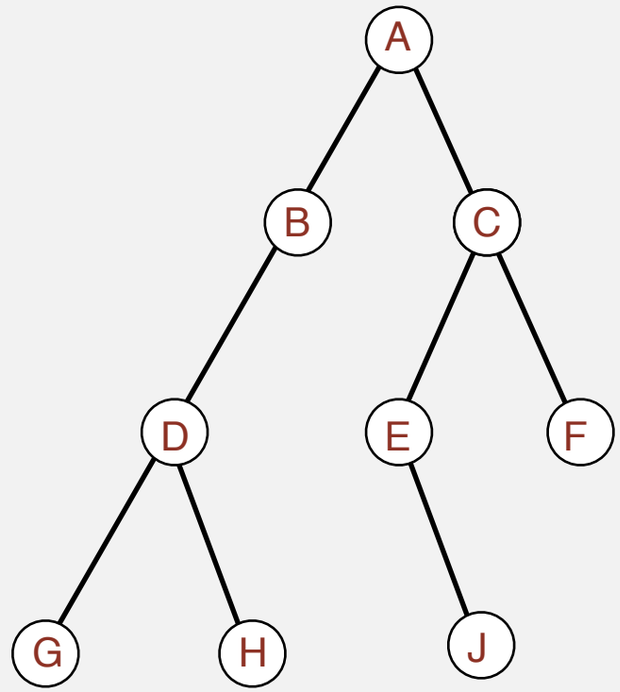
D. G H D J E B F C A

E. G D H B E J A C F

Quiz 3 - Sept 27, 2017

Q2. Which traversal order of the binary tree shown on the right produces the following sequence?

G H D B J E F C A



A. Preorder

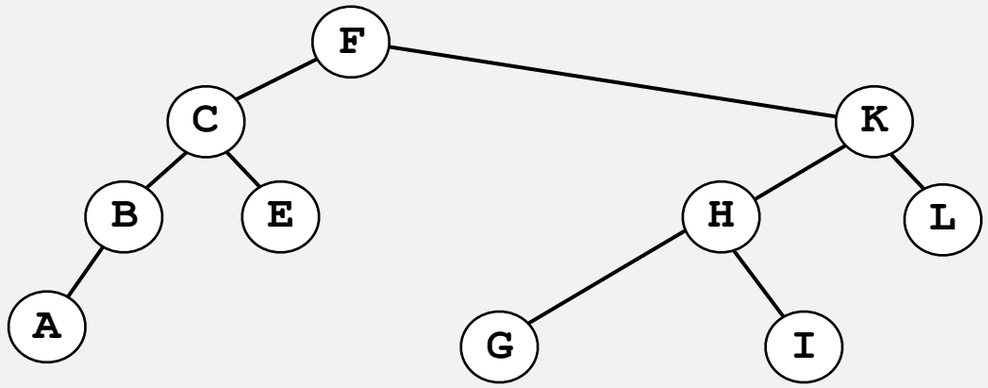
B. In order

C. Post order

D. None of the above

Quiz 3 - Sept 27, 2017

Q3. Which of the following insertion orders could have produced the BST shown here?



A. F C B E K G H A L I

B. F K C B A E H G I L

C. F C B A E K L I H G

D. None of the above

E. All of the above

Quiz 4 - Nov 1, 2017

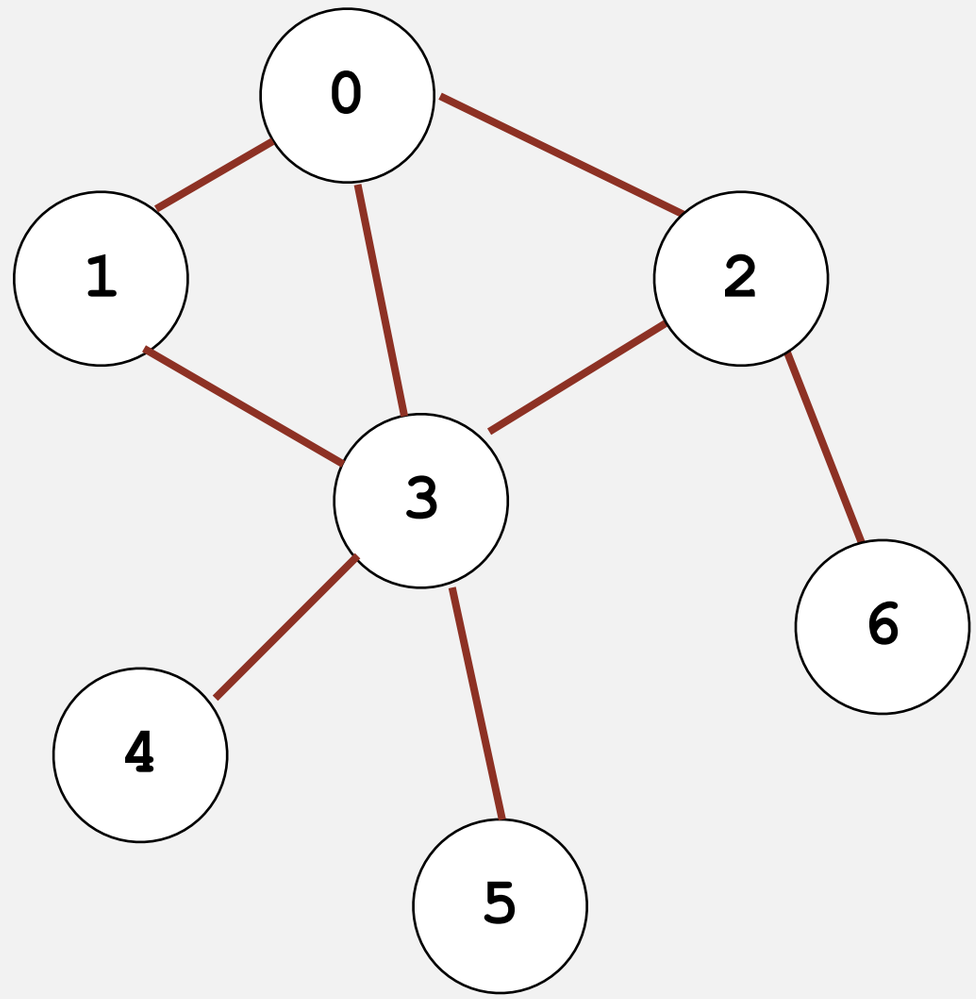
Q1. Consider the unoriented graph below. Which of the lists below corresponds to a **DFS from 0**?

A. 0 1 3 2 6 5 4

B. 0 1 2 3 4 5 6

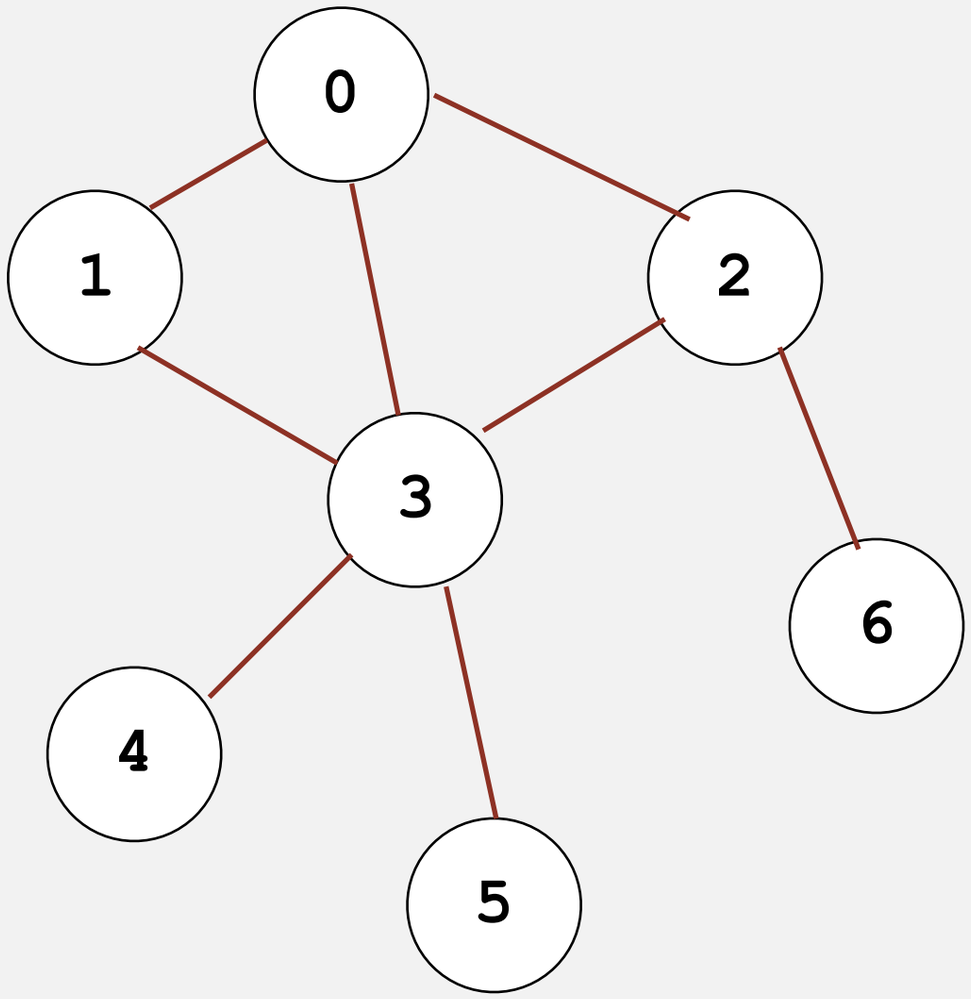
C. 0 1 2 3 6 4 5

D. None



Quiz 4 - Nov 1, 2017

Q2. Consider the unoriented graph below. Which of the lists below corresponds to a **BFS from 0**?



A. 0 1 3 2 6 5 4

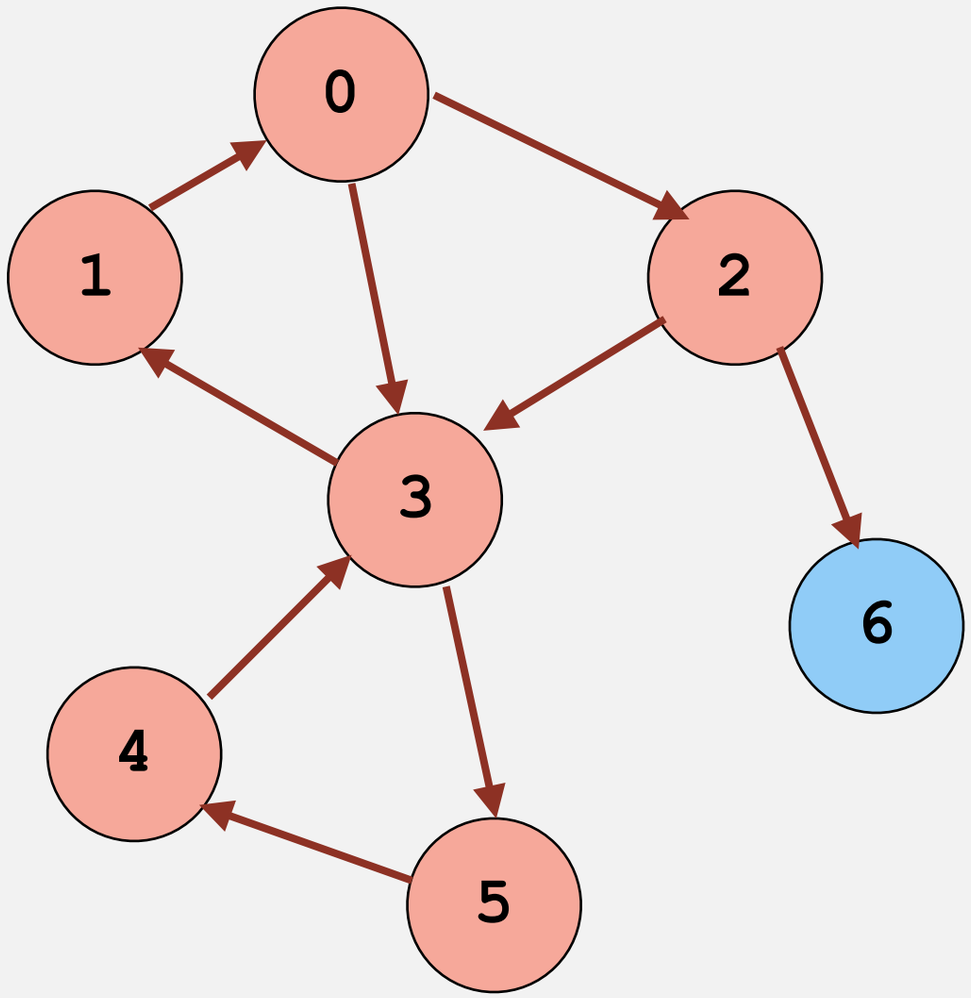
B. 0 1 2 3 4 5 6

C. 0 1 2 3 6 4 5

D. None

Quiz 4 - Nov 1, 2017

Q3. Consider the directed graph below. How many **strongly connected components** are there?



A. 1

B. 2

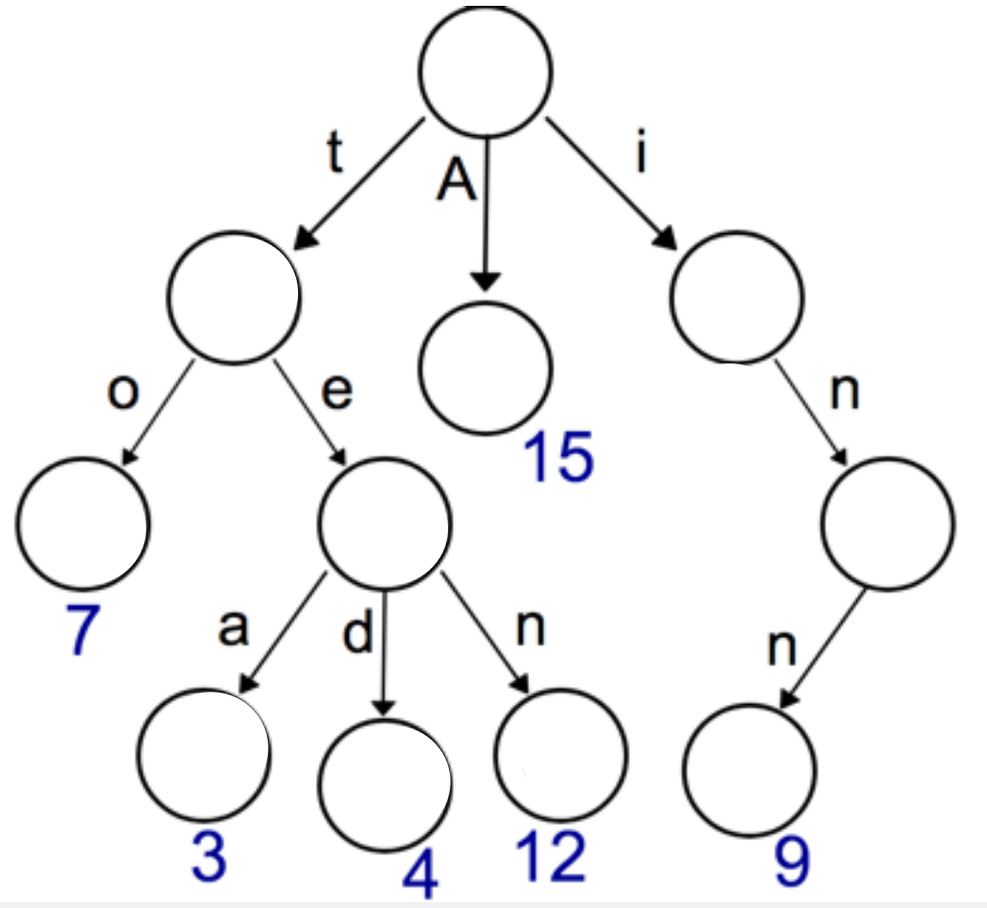
C. 3

D. 7

E. None of the above

Quiz 5 - Nov 29, 2017

Q1. Consider the R-way trie on the right. Which of the following strings are valid keys.



A. to

B. in

C. tea

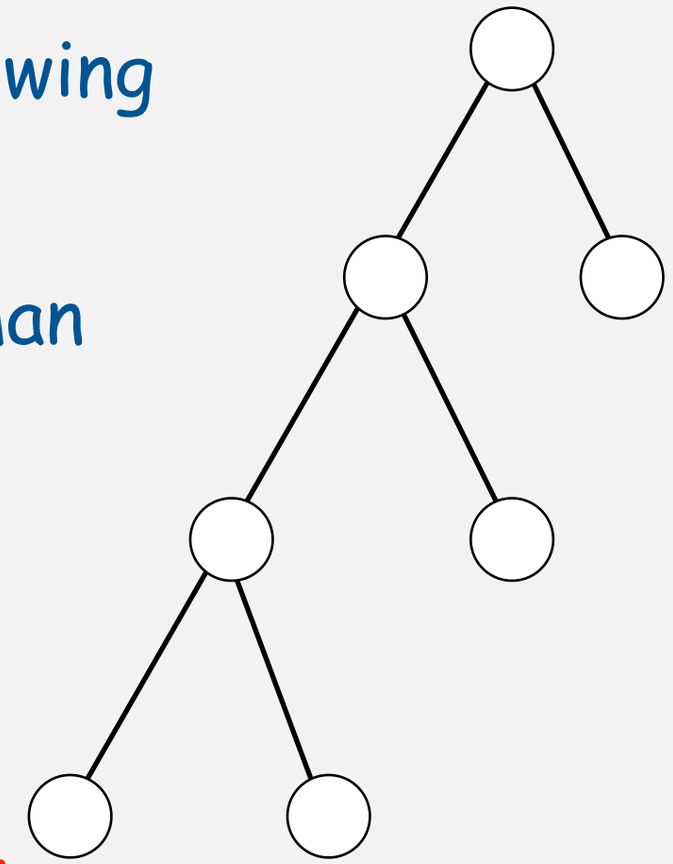
D. A & C

E. A, B & C

Quiz 5 - Nov 29, 2017

Q2. Consider the Huffman compression of following sequence: T R A L A L A

Assuming the trie representation of the Huffman encoding looks like the one shown, which of the following encodings is / are possible?



A. A: 001, L: 000, R: 01, T: 1

B. A: 1, L: 01, R: 000, T: 001

C. A: 01, L: 1, R: 001, T: 000

D. B and C

E. None of the above

Quiz 5 - Nov 29, 2017

Q3. Consider the LZW compression of following sequence:

T R A L A L A L A

Assuming the initial codes are **A**: 41, **L**: 4C, **R**: 52, **T**: 54, and new codes start at 81, which of the following encodings is / are correct?

A. 54 52 41 4C 81 83

B. 54 52 41 4C 83 84

C. 54 52 41 4C 82 84

D. 54 52 41 4C 83 85

E. None of the above