

DATA STRUCTURE – Work Sheet

1. 02-03 C4 Data Structures

Build a binary search tree with the letters **BEAUTYANDTHEBEAST** starting with B and ending with the last T. How many nodes have 1 child?

2. 02-03 C4 Data Structures

Build a binary search tree with the letters **PINOCCHIO**. What is the depth of the tree?

3. 03-04 C4 Data Structures

Construct a binary search tree for **MIRSPACESTATION**. What is the depth of the tree?

4. 03-04 C4 Data Structures

Consider the following sequence of operations on an initially empty queue. What would be the next item popped? Read the statements left to right, then top to bottom.

PUSH (D),	PUSH (A),	PUSH (T),	POP (X),	PUSH (A),
POP (X),	PUSH (S),	PUSH (T),	POP (X),	POP (X),
PUSH (R),	PUSH (U),	PUSH (C),	POP (X),	POP (X),
POP (X),	PUSH (T),	PUSH (U),	PUSH (R),	POP (X),
PUSH (E)				

5. 04-05 C4 Data Structures

In the binary search tree for **PENNSYLVANIA**, how many nodes have only one child?

6. 04-05 C4 Data Structures

Given an initially empty stack and the following operations (left to right, then top to bottom):, what element would be popped next?

PUSH (B),	PUSH (E),	PUSH (N),	POP (X),	PUSH (J),
POP (X),	PUSH (A),	PUSH (M)	PUSH (J),	POP (X),
POP (X)				

7. **05-06 C4 Data Structures**

How many nodes have only one child in the binary search tree of the word **CONCATENATION**?

8. **05-06 C4 Data Structures**

What would be the next item removed from the stack formed by the following operations (left to right, then top to bottom):

**PUSH(B), PUSH(O), POP(X), PUSH(O), PUSH(L), POP(X),
POP(X), PUSH(E), POP(X), PUSH(A), PUSH(N), POP(X),
POP(X).**

9. **06-07 C4 Data Structures**

How many nodes have only one child in the binary search tree of the word **GLOBALWARMING**?

10. **06-07 C4 Data Structures**

Given an initially empty stack and the following sequence of operations, what would be the next POPPED element? Read the statements left to right, then top to bottom.

**PUSH(T), PUSH(A), PUSH(Y), POP(X), PUSH(L), POP(X),
POP(X), PUSH(O), POP(X), PUSH(R), PUSH(T), PUSH(X),
POP(X)**

11. **07-08 C4 Data Structures**

What is the depth of the binary search tree for **WILLIAMSHAKESPEARE**?

12. **07-08 C4 Data Structures**

Given an initially empty stack and the following sequence of operations, what would be the next POPPED element? Read the statements left to right, then top to bottom.

**PUSH(M), PUSH(A), PUSH(C), POP(X), PUSH(B), POP(X),
POP(X), PUSH(E), PUSH(T), PUSH(H), POP(X)**

13. **08-09 C4 Data Structures**

What is the depth of the binary search tree for: **INDIANAJONES**?

14. **08-09 C4 Data Structures**

Given an initially empty queue and the following sequence of operations, what would be the next POPPED element? Read the statements left to right, then top to bottom.

**PUSH(F), PUSH(I), PUSH(B), POP(X), PUSH(O), POP(X),
POP(X), PUSH(N), PUSH(A), POP(X), PUSH(C), PUSH(C),
POP(X), PUSH(I)**

15. **09-10 C4 Data Structures**

In the binary search tree for **KEYSTONESTATE**, how many nodes have only 1 child?

16. **09-10 C4 Data Structures**

Define a new operation **SWP(x)**: swap x items from the pop end with x items from the push end. Given an initially empty queue and the following sequence of operations, what would be the next POPPED element?

**PUSH(A), PUSH(B), PUSH(C), SWP(1), POP(X),
PUSH(D), POP(X), SWP(1), PUSH(E)**

17. **10-11 C4 Data Structures**

Construct the binary search tree for the word below. How many nodes have only one left child?

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18. **10-11 C4 Data Structures**

The command **REV** reverses the order of the elements. Given an initially empty stack and the following sequence of operations, what would be the next POPPED element?

**PUSH(S), PUSH(P), PUSH(A), POP(X), REV, PUSH(C),
PUSH(E), POP(X), REV, PUSH(S), POP(X), REV**

19. **11-12 C4 Data Structures**

What is the depth of the binary search tree for: **PENNSYLVANIA**?

20. **11-12 C4 Data Structures**

Given an initially empty queue and the following sequence of operations, what would be the next POPPED element? Read the statements left to right, then top to bottom.

**PUSH(L), PUSH(I), PUSH(B), POP(X), POP(X), PUSH(E),
PUSH(R), POP(X), POP(X), PUSH(T), PUSH(Y)**

21. **12-13 C4 Data Structures**

How many **nodes** have only one child in the binary search tree for **DUKEUNIVERSITY**?

22. **12-13 C4 Data Structures**

Given an initially empty queue and the following sequence of operations, what would be the next POPPED element? Read the statements left to right, then top to bottom.

**PUSH(E), PUSH(N), PUSH(L), POP(X), PUSH(O), POP(X),
POP(X), PUSH(E), POP(X), PUSH(H), PUSH(S), POP(X)**

23. **13-14 C4 Data Structures**

List the nodes that are at depth 6 in the binary search tree for: **DENVERCOLORADO**

24. **13-14 C4 Data Structures**

Given an initially empty stack and the following sequence of operations, what would be the next POPPED element? Read the statements left to right, then top to bottom.

**PUSH(R), PUSH(O), PUSH(C), PUSH(K), POP(X), POP(X),
PUSH(Y), PUSH(M), POP(X), PUSH(T), PUSH(N), POP(X),
POP(X)**

25. **14-15 C4 Data Structures**

Create a binary search tree using the string **DISNEYWORLD**. How many nodes have just one child?

26. **14-15 C4 Data Structures**

Given the following commands on an initially empty queue, what is next item that would be POPPED?

Read the statements left to right, then top to bottom.

PUSH(S);	PUSH(U);	PUSH(N);	POP(X);	PUSH(S);	PUSH(H);
PUSH(I);	POP(X);	PUSH(N);	PUSH(E);	PUSH(S);	PUSH(T);
POP(X);	PUSH(A);	PUSH(T);	PUSH(E);	POP(X);	POP(X);
POP(X);	POP(X);	POP(X)			

27. **15-16 C4 Data Structures**

How many nodes have only one child in the binary search tree for **NASHUAHIGH SCHOOL**?

28. **15-16 C4 Data Structures**

Given an initially empty queue and the following sequence of operations, what would be the next POPPED element? Read the statements left to right, then top to bottom.

PUSH(N),	PUSH(A),	PUSH(T),	POP(X),	POP(X),	PUSH(H),
PUSH(A),	POP(X),	PUSH(N),	POP(X),	POP(X),	PUSH(H),
PUSH(A),	POP(X),	PUSH(L),	POP(X),	PUSH(E),	POP(X)