CSE 5/7350 Quiz #1
Background Material
January 17, 2023

Name:_____

ID:_____

All Questions are 4 points each:

1. Find a simple formula for $\sum_{i=1}^{k}(2i-1)$ =
2. Find a simple formula for $\sum_{i=1}^{k}(3+i^2)$ =
3. Compute the value of $\sum_{i=1}^{\infty}\left(\frac{1}{2}\right)^{i-1}$ =
4. Compute the value of $\lim_{n\to\infty}\left(\frac{4n}{3n}\right)$ =
5. Compute the value of $\lim_{n\to\infty}\left(\frac{n^4}{n^3}\right)$ =
6. Compute the value of $\lim_{n\to\infty}\left(\frac{2^n}{5^n}\right)$ =
7. Compute the value of $\lim_{n\to\infty}\left(\frac{n!}{(n+2)!}\right)$ =
8. Compute the value of $\lim_{n\to\infty}\left(\frac{\log_{12} n}{\log_3 n}\right)$ =
9. Compute $\log_2 487$. Give your answer rounded to 6 decimal places (x.xxxxxx)

Consider a bag of 7 blocks. Each block has a different color. The colors are Red, Orange, Yellow, Green, Blue, Indigo and Violet.

10. How many different ways can you pick out 4 blocks from a bag of 7 blocks? The order you pick out the blocks does not matter. (answer with an integer)
11. How many different ways can you rearrange the 7 blocks? (answer with an integer)
12. You reach into the bag and pull out a block. What is the probability that it is Red, Orange or Yellow or Green and not Blue, Indigo or Violet?

13. You reach into the bag of 7 blocks and pull out 2 blocks. What is the probability that at least one of the blocks you pulled out is Red, or Orange?

Answer the following questions with either:

A. The time depends on size of n and twice as large will likely require about twice the time.
B. The time depends on size of n but twice as large will generally be less than twice the time.
C. Constant amount of time regardless of size of n

14. How long will it take to insert an element at the head of a linked list of size n?

15. How long will it take to remove an element from a doubly linked list of size n if you only have a pointer to the element you wish to remove and are unable to copy the data of the elements?

16. How long will it take to remove an element from a linked list of size n if you only have a pointer to the element you wish to remove?

17. How long will it take to insert an element at the beginning of an array of size n?

18. How long will it take to delete element k (where k is close to 1/2 n) from an array of size n where order does not matter?

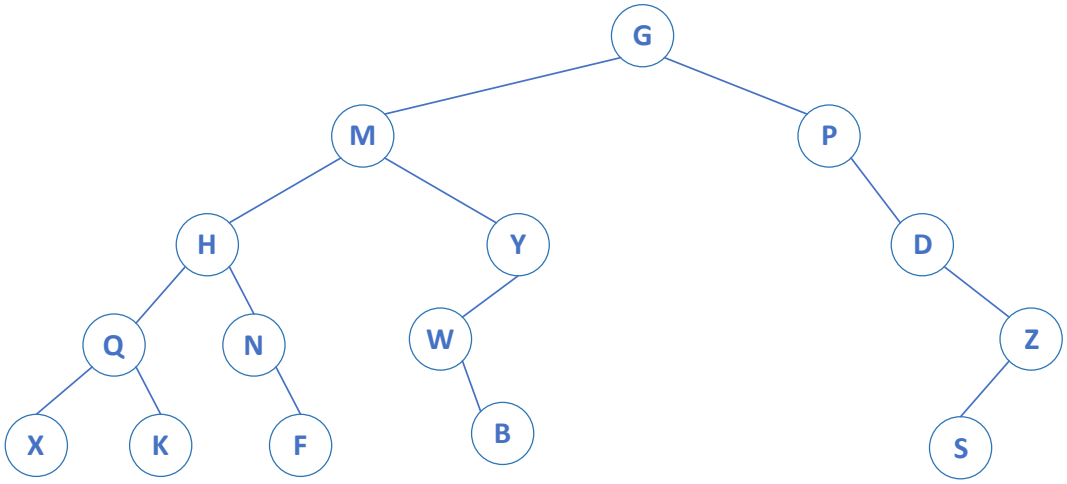
19. How long will it take to delete element k (where k is close to 1/2 n) from an array of size n where order does matter?

20. How long will it take to determine if an element exists in a sorted linked list of size n?

21. How long will it take to determine if an integer exists in a sorted array of n integers?

22. How long will it take to correctly insert an element into an AVL tree of size n.

Consider the following tree:



23. Give a pre-order traversal of the tree

24. Give a post-order traversal of the tree

25. Give an in-order traversal of the tree.