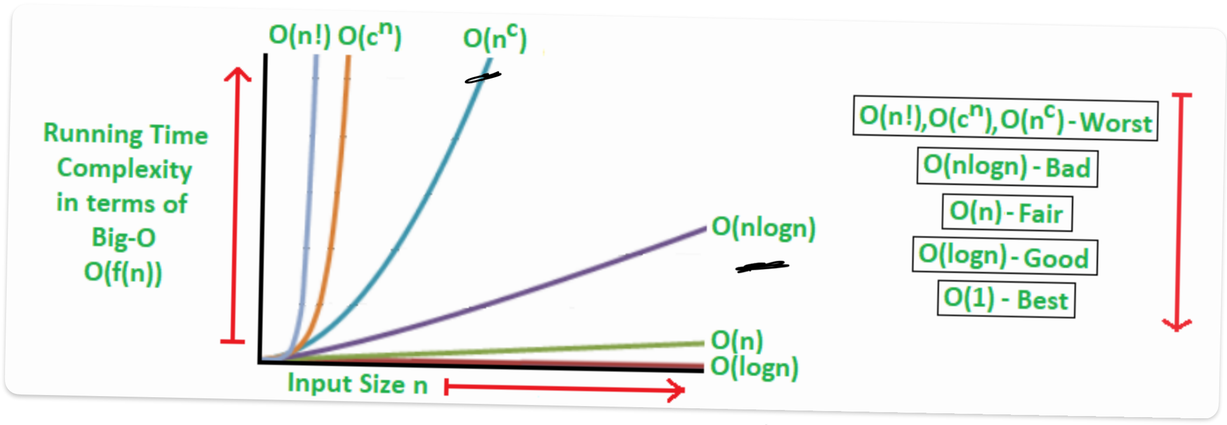
Question 1



O	Ω	Θ
Big Oh	Omega	Theta
Upper Bound	Lower Bound	Upper & Lower Bound
Worst Case	Best Case	Average 'ish'

1. Circle/mark all the statements below that are true:

a. $\log(n) = O(n)$ $\log n < n$

b. $n = O(\log(n))$ $n < \log n$

c. $\log^2(n) = O(n)$ $2\log n < n$

d. $n = O(\log^2(n))$ $n < 2\log n$ ignore 2

e. $\log(n) = \Omega(n)$ $\log n > n$

f. $n = \Omega(\log(n))$ $n > \log n$

g. $5n^3 + 7n + 13 = O(n^5)$ $5n^3 < n^5$

h. $5n^3 + 7n + 13 = \Omega(n^5)$ $n^3 > n^5$

i. $5n^3 + 7n + 13 = \Omega(n)$ $n^3 > n$

j. $\log(n!) = \theta(n\log(n))$ $\log(n!) = \Theta(n\log n)$ → both upper and lower bounds are same

$\log(n!) \leq O(n\log n)$
$\geq \Omega(n\log n)$] true

$n^{1/2} < \log n$

k. $n^{1/2} = O(\log(n))$

$\sqrt{n} < 2\log n$

l. $2^n = \Omega(n!)$ $2^n > n!$ → absolute worst runtime

2. Answer the following

a. What is the worst-case big-oh run time of Merge sort on n items?

$O(n\log n)$

b. What is the worst-case big-oh run time of Selection sort on n items?

$O(n^2)$