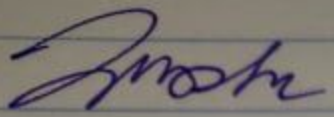


By Signing the following, I attest that all the work on this exam is my own. I have neither given nor received aid on this test. I did not Search the internet for answers.

1. Master Theorem

A. $T(n) = 9T(n/3) + n^{2.5}$

$a = 9$

$b = 3$

$d = 2.5$

$9 < 3^{2.5}$

$T(n) = \Theta(n^{2.5})$

B. $8T(n/2) + n^{*2} - 2$

$a = 8$

$b = 2$

$d = *2$

$8 > 2^2$

$T(n) = \Theta(n^{\log_2 8})$

C. $4T(n/4) + n - 3$

$a = 4$

$b = 4$

$d = 1$

$4 = 4^1$

$T(n) = \Theta(n \log n)$

D. $8T(n/2) + n^4 - 2$

$a = 8$

$b = 2$

$d = 4$

$8 < 2^4$

$T(n) = \Theta(n^4)$

2. String Matching

a.

a	b	c	d	e
2	6	1	7	7

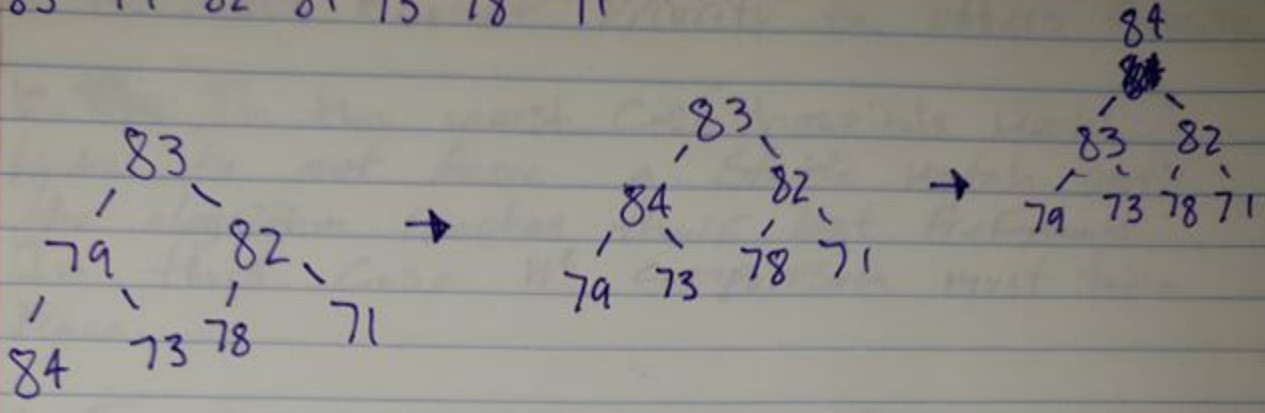
BACAACA	2
BACAACA	3
BACAACA	3
BACAACA	7
BACAACA	7
BACAACA	7

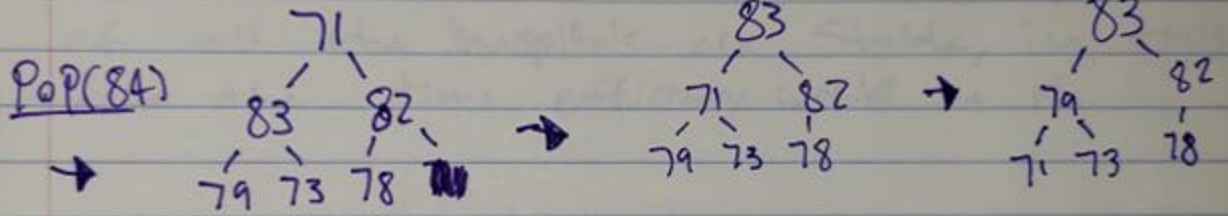
b.

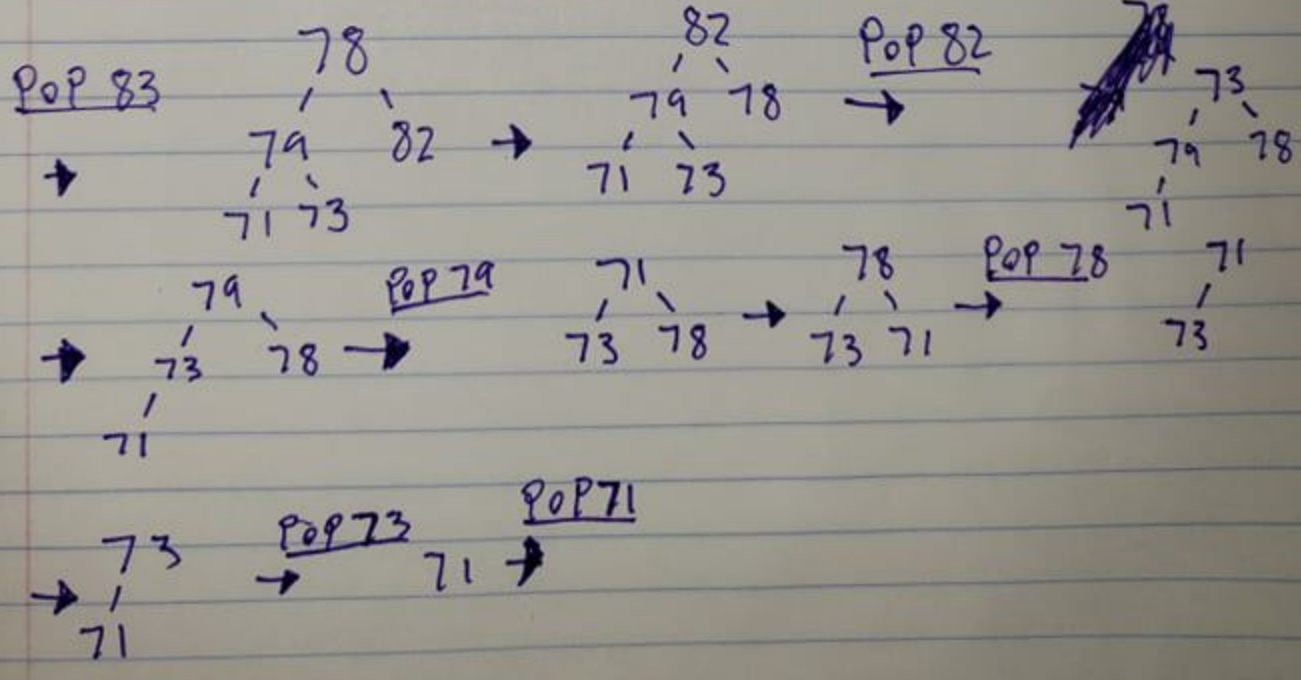
B	A	A	B	A	C	A	C	B	A	C	B	A	C	A	A	C	A	B	E	D
B	**A**	**C**	**A**	**A**	**C**	**A**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			B	**A**	**C**	**A**	**A**	**C**	**A**											
								B	**A**	**C**	**A**	**A**	**C**	**A**						
											B	**A**	**C**	**A**	**A**	**C**	**A**			

3. Heap Sort

S O R T I N G
83 79 82 84 73 78 71







4. Iterative Improvement

a. The basic operation is comparing a residents current priority to offers priority.

b. In the worst case hospitals would have to not have a stable match until the algorithm reaches their last preferences. In this case n^2 comparison must take place.

c. In the best case The first choices of all the hospitals are stable, in this case the time efficiency would be n.

6. Matrix Smallest Sum

Big Size: $F(m,n) = F(m,n) + \min(F(m-1,n-1), F(m,m-1), \ldots, F(m+1,n-1))$

Small Size: $F(m,n) = \min(F(m-1,n), F(m,n), F(m+1,n))$

7. Triangle Smallest Sum

Big Size: $F(m,n) = F(m,n) + \min(F(m,n-1), F(m+1,n-1))$

Small Size: $F(m,n) = \min(F(m,n-1), F(m+1,n-1))$