Quiz-0 on Background Points 20 Time 30 minutes.

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1. What is the number of elements in a Power set P of a set S of n elements?

(Power set P is a set of all subsets of S.) *2^n*

2. Draw a vertical stack with elements entered in this sequence {a, 0, b, 2, c}.

Show your direction, just to be sure! *Reading from ‘a’ first, it goes to the bottom, LIFO.*

3. Draw horizontally a queue where above elements are entered in the same sequence.

Show your direction, just to be sure! *Reading from ‘a’ first, it goes to the front, FIFO.*

4. At the most how many triangles may be drawn with 15 nodes? *15 choose 3 = 15\*14\*13/3\*2*

5. How many arcs will be there in a complete undirected graph with 15 nodes? *15 choose 2 = 15\*14 /2*

6. How many arcs are there on a (connected) tree with 15 nodes? *15-1*

7. Write a pseudo-code fragment (any language, or independent of language)

for the following formula: f(x) = f(x-1)\*f(x-2), where f(0)=1, f(1)=2, with integers x.

You may like to print the sequence, from 0-th element up to n-th element

for an input integer n. *Recursive will do, with input x: if x==0 or x==1 return 1; else return f(x-1)\*f(x-2); // to print within recursion is not a good idea, why?*

8. Write an istance of a "formal language" over the set {a, 0, b, 2, c}.

Not the empty language :) *Anything is ok, you just should know what a language mean, e.g. L={all strings containing symbols ‘a’ and ‘2’}*

9. Draw a tree with the following undirected arcs

{(a,b), (b,d), (b,e), (e,g), (a,c), (c,f)}. Number the nodes in a post-order depth first search traversal starting from node a as the 0-th node. *Draw the tree first. Post-order= when no more children to call on: d-0, g-1, e-2, b-3, f-4, c-5, a-6*

10. Prove by mathematical induction that arithmetic sequence 1+2+3+...+n results in n(n+1)/2. Write clearly your induction "base", "hypothesis", and "step". *Base: n=1, show formula is correct. Hyp: Assume true for n=k. Step: For n=k+1, add (k+1) on both sides of the formula and show that it is still correct.*