Algorithmic Methods: Exam Simulation

Exercise 1

1. $T(n) = 3T(\frac{n}{2}) + O(n)$
2. log_2n
3. $n^{log_23}+1$
4. $log_ba - \epsilon = 1$

   sol = $\Theta(n^{log_23})$

   alt sol = $T(n) = \sum_{i = 0}^{log_2n-1}(\frac{1}{2})^i*n + \Theta(n^{log_23})$

   $\sum_{i = 0}^{log_2n-1}(\frac{1}{2})^i*n < \Theta(n^{log_23})\implies \Theta(n^{log_23})$

Exercise 2

1. 181
2. 120/200 = 0.6
3. 225 mod 53 = 13

Exercise 3

_	_	**b**	**a**	**a**	**b**	**c**
_	0	0	0	0	0	0
b	0	1↖	1←	1←	1↖	1←
c	0	1↑	1←	1←	1←	2↖
a	0	1↑	2↖	2↖	2←	2←
b	0	1↖	2↑	2←	3↖	3←
a	0	1↑	2↖	3↖	3←	3←

Exercise 4

1. True
2. False ("best" worst case is nlogn)
3. False
4. True
5. True (Heapsort to the 3rd element O(3logn))

Exercise 5

a) False

b) True

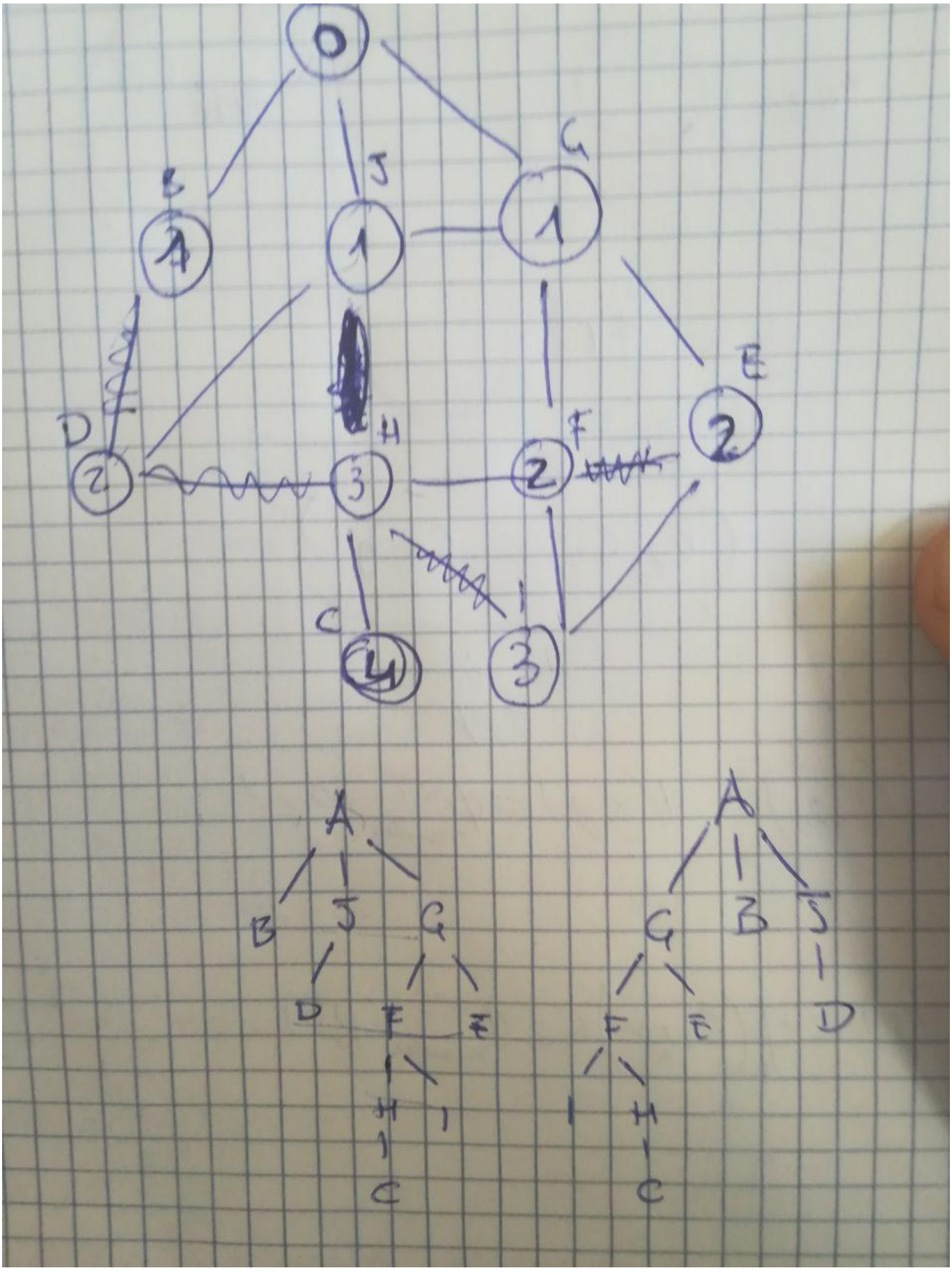
c) False

d) False

e) False

f) True

Exercise 6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