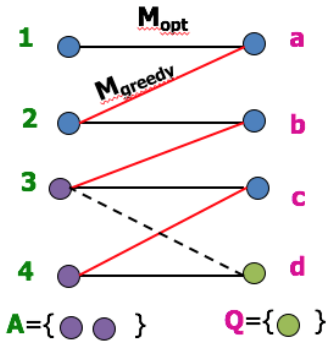
Quiz: Web Advertising

Name: _____ ID: _____

1) (1 pt) Explain and write the definition of the competitive ratio.

2) (1 pt) Show a case using 4 ads and 4 queries to demonstrate the worst-case scenario in the greedy algorithm.

3) (3 pts) Using the example below to show that the competitive ratio of the greedy algorithm is ½. (You need to use the sets Q and A in your answer.)



4) (1 pt) Fill up the table below with the Balance algorithm

- **Bidder A_1:** **bid $x_1 = 20$** **budget $b_1 = 40$**
- **Bidder A_2:** **bid $x_2 = 10$** **budget $b_2 = 50$**
- Assume ties are broken in favor of A_1

Query q	Assigned to Bidder (A_1, A_2 or No Ad)	Remaining Budget for A_1	Remaining Budget for A_2
At start	----	40	50
1st query q			
2nd query q			
3rd query q			
4th query q			
5th query q			
6th query q			
7th query q			
8th query q			

5) (4pts) Explain the competitive ratio for Balance algorithm with multiple bidders