CSCI 4380 Spring 2018 Quiz 5 [Time: 25 minutes]

Name 1:	RCS ID1:
Name 2:	RCS ID2:
Name 3:	RCS ID3:

Rules.

- Open book and notes. Do not use any electronic tools including your computer.
- You can talk to anyone in class. If you know the answer, help someone else in class.
- Each quiz must be by at least two and at most three people. Most quizzes should be by three people, so find someone to talk to. Put your name on one quiz only.

Question (25 points). Suppose you are given the following B-tree indices, each indexing a relation `R(A,B,C,D,E,F)` with 200,000 tuples. In each index, assume that the leaf nodes are ordered consecutively on disk so they can be read sequentially from left to right following sibling pointers. In all other levels, you can assume nodes are accessed with random I/O.

Index	Columns Indexed	Height	#nodes at leaf level
i1	R(A)	3	1000
i2	R(B)	3	2000
i3	R(A,B)	4	3000

You are also given the following information, PAGES(R)=8,000, and:

Tuples that match the condition `A>20`: 20
Tuples that match the condition `B=5`: 100
Tuples that match the condition `A>20 and B=5`: 3

Question. What is the cost of answering the following query:

`Q1: select * from where A >20 and B=5`?

Please answer in the next page and show your work. You can assume that you have sufficient memory allocated to answer this query in one pass.

Use this area for scratch work!

Answer here.

Question	Number of index pages read (and how many of them will be a random I/O costing a seek operation)	Number of relation `R` pages read (assume worst case scenario where each matching tuple is in a different disk page)
1(a) Answer `Q1` by scanning `R` only		
1(b) Answer `Q1` scanning i1 first and read matching tuples from `R`		
1(c) Answer `Q1` scanning i2 first and read matching tuples from `R`		
1(d) Answer `Q1` scanning i3 first and read matching tuples from `R`		
1(e) Answer `Q1` scanning i1&i2, intersect matching tuple ids in memory, and read matching tuples from `R`		