Mohammad Ali Zahir

ID: 40077619

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SOEN 363: Data Systems for Software Engineers – Section S

**SOEN 363 – Assignment 3**

1. 1. Chart

      Description automatically generated
   2. The resulting tree would be B
   3. The resulting tree would be A
   4. The resulting tree would be A
2. 1. We know that a B+ tree has at most 2d keys, and 2d +1 pointers. Hence, since we have the total size of the page which is 2000 bytes. We can derive the following equation.

116d

So since we found d = 17, we can then say that we have 2(17) = 34 keys, and 2(17) + 1 = 35 pointers. We also know that each record on a leaf page will take 58 bytes (50 + 8 bytes). Hence then we can do the following calculation to find the number of records.

Hence to find the number of levels, we can now do

= 2.64, so this means we would need 3 levels.

b. For level 3, we would have, 20 000/34 = 589 nodes

For level 2, we would have, 589/35 = 17 nodes

For level 1, we would have the one node which is at the root of the tree.

c. Since we know that the 70% of the pages are full, we know that the new size of the disk page would 0.7 \* 2000, which is 1400 bytes. If we assume no key compression, we can find the value for d, the same way we found it for question a.

36d

Hence, this would mean that we have 2(38) = 76 keys, and 77 pointers. Each record on the leaf page will be 18 bytes (10 +8 bytes). Hence, we could do the following calculation to obtain the number of records.

Hence to find the number of levels, we can now do

= 2.28, so this means we would need 3 levels.