Part 1 - Selecting Indexes

Find all employees that started after a certain date:
    CREATE INDEX(Start Date)
Find all employees that started on a certain date, and worked until at least another certain date:
    CREATE INDEX(Start Date, End Date)

Get all students with a grade better than 'B':
    CREATE INDEX(Grade)
Get all classes where any student earned a grade worse than 'D':
    NONE because this is handled by the index above
Get all classes ordered by class name:
    CREATE INDEX(className)
Get all students who earned an 'A' in a certain class:
    NONE because this is handled by the grade index above

Queries on the chess database
select Name from Players where Elo >=2050:
    CREATE INDEX(Elo)
select Name, gID from Players join Games where pID=WhitePlayer:
    CREATE INDEX(Games.WhitePlayer, Players.pID)

Queries on the public Library database
select * from Inventory natural join CheckedOut:
    CREATE INDEX(CheckedOut.Serial, Inventory.Serial)

More library queries:
select * from Inventory natural join CheckedOut where CardNum=2:
    CREATE INDEX(CheckedOut.CardNum)
select * from Patrons natural join CheckedOut:
    CREATE INDEX(CheckedOut.CardNum, Patrons.CardNum)

Still more library queries
```
var query =
  from t in db.Titles
  select new
  {
    Title = t.Title,
    Serials = from i in t.Inventory select i.Serial
  };
```

This is joining Titles and Inventory on ISBN, filtered by Title to get Serial from Inventory
    CREATE INDEX(Titles.Title, Titles.ISBN, Inventory.ISBN)

Part 2 - B+ Tree Index Structures

Students table:

Consider the students table from #2 in Part 1 above. Assume that an int occupies 4 bytes, and a varchar(10) occupies 10 bytes.

How many rows of the table can be placed into the first leaf node of the primary index before it will split?
-   273 rows

What is the maximum number of keys stored in an internal node of the primary index? (Remember to ignore pointer space. Remember that internal nodes have a different structure than leaf nodes.)
-   292

What is the maximum number of rows in the table if the primary index has a height of 1? (A tree of height 1 has 2 levels and requires exactly one internal node)
-   79,989

What is the minimum number of rows in the table if the primary index has a height of 1? (A tree of height 1 has 2 levels). The minimum capacity of a node in a B+ tree is 50%, unless it is the only internal/leaf node. The minimum number of children of a root node is 2.
-   292
If there is a secondary index on Grade, what is the maximum number of entries a leaf node can hold in the secondary index?
-   273

Another table

Assume that for some table, rows occupy 128 bytes.

What is the maximum number of leaf nodes in the primary index if the table contains 48 rows?

- 3
- 128 * 48 = 6144/2048 = 3

What is the minimum number of leaf nodes in the primary index if the table contains 48 rows?
- 2
- 128 * 48 = 6144/4096 = 1.5~