

CS150A Quiz02

File Formats

Assume that each page in our system can hold 128 KB (1 KB = 1024bytes), integers are 32-bits wide, and bytes are 8-bits wide.

Consider the following relation:

```
CREATE TABLE Submissions (  
    record_id integer UNIQUE,  
    assignment_id integer,  
    student_id integer,  
    time_submitted integer,  
    grade_received byte,  
    PRIMARY KEY (assignment_id, student_id)  
);
```

Assume the column record_id corresponds to the row's actual record ID.

Q1: How large (in bytes) is a record?

Q2: Suppose we begin each page with a 32-bytes header plus a bitmap. At most, how many records can fit in an unpacked page?

We add two variable-length fields to our table schema. Now our table looks like this:

```
CREATE TABLE Submissions (  
    record_id integer UNIQUE,  
    assignment_id integer,  
    student_id integer,  
    time_submitted integer,  
    grade_received byte,  
    comment text,  
    regrade_request text,  
    PRIMARY KEY (assignment_id, student_id)  
);
```

We decide to use slotted pages to store the variable length records. Each page begins with a 32-bytes header plus a slot directory. (Assume this header contains information such as the number of valid records in the page.) Each pointer inside the slot directory consumes 20bits/record, while the record header storing field offsets is 32 bits wide.

Q3: What is the **maximum** number of records that can fit in our slotted pages?

Q4: We decide to squash the two text fields together into one field using a semicolon separator character (;), which allows us to shrink the record header from 32 bits to 16 bits at the cost of 8 bits (for the semicolon). For example, the columns ("Submitted late", "Dog ate my homework") get compressed into "Submitted late;Dog ate my homework". Which of the following are true with this new scheme?

Check all that apply.

- A. Professor Gonzales can enter the comment "Fantastic work; good job!"
- B. Fewer records will fit in a page
- C. More records will fit in a page
- D. It is possible for the query "SELECT grade_received FROM Submissions" to finish faster