Recitation 5: Exam 1 Review

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15213 Section A
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- Office hours:
  - NSH 2504 (lab) / 2507 (conference room)
  - Tuesday 4–5

- Lab 3: due Monday (7 Oct), 11:59pm
- Lab 4: later this week (probably by Thursday)
- Exam 1: Tuesday (8 Oct), 6:00–7:30pm
  Doherty Hall 2315

Today's Plan

- Exam 1 review
  - Problems from last fall's exam 1
    - Floating Point
    - Unions

Floating Point

- s: sign bit
- exp: encodes E (*m* bits)
  - value unbiased
  - bias = $2^{m-1} - 1$
- frac: fractional number (*n* bits)
  - Normalized: [1.0, 2.0)
    - exp ≠ 0…0 & exp ≠ 1…1
  - Denormalized: [0.0, 1.0)
    - exp = 0…0

Example: exp with 3 bits

exp	exp	E	2^E	
0	000	−2	¼	(denorms)
1	001	−2	¼	
2	010	−1	½	
3	011	0	1	
4	100	1	2	
5	101	2	4	
6	110	3	8	
7	111	n/a		(inf, n/a)

Practice Problems

- #2 floating point
- #1 two's-complement
- #5 array index
- #7 struct layout (with unions)

#7 changes

```
typedef union {
  OldSensorData     oldData;
  NewSensorData     newData;
} SensorDataUnion;
```