CS 305
Design and Analysis of Algorithms

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Today's Topics

- Questions / Comments?
- Probability
  - Sample space
  - Event
  - Elementary event
  - Probability function
  - Complement of an Event
  - Hash table example with Simple Uniform Hashing
  - Outcomes
  - Random Variable – a function that maps outcomes to Reals
  - Probability Mass Function
  - Expected Value of a Random Variable

```
PARTITION (LIST, START, END)
1a. RANDIDX ← RAND(START, END)
1b. SWAP(LIST, END, RANDIDX)
1c. PIVOT ← END
2. LASTLHS ← START - 1
3. FIRSTUNK ← START
4. WHILE FIRSTUNK < END
5.     IF LIST[FIRSTUNK] < LIST[PIVOT]
6.         LASTLHS++
7.         SWAP(LIST, LASTLHS, FIRSTUNK)
8.     FIRSTUNK++
9. SWAP(LIST, PIVOT, LASTLHS+1)          // PUT PIVOT ELEMENT
10. RETURN LASTLHS+1                     // IN CORRECT PLACE
```

```
QUICKSORT(LIST, START, END)
1. IF START < END
2.     PIVOT ← PARTITION(LIST, START, END)
3.     QUICKSORT(LIST, START, PIVOT-1)
4.     QUICKSORT(LIST, PIVOT+1, END)
```