CS 105 TA Lecture Notes
October 15, 2014

Announcements:

- Mid-term 1 grades out.
  - Every color is a different grade A through E, most of you got 'A's.
  - With the extra credits added up, graph improves for the total grade so far.
  - Median: 79.9 on midterm 1, mean / average = 77 approx. (by making the graph flat, putting the As, i.e. greens, to the other side and putting on top of red stuff)
  - Overall grade: Median = 90%.
  - 'B's can still improve their grade, lot of credit still to be earned.
  - It is absolute grading and there's no curving, so everyone can theoretically get an A.
  - 12 Extra credits so far and similar in the next half of the course.
  - Yellow have a fighting chance of getting close to the A and orange and red probably missed assignments, labs, MPs etc.
  - 320 points awarded so far. Freshmen have been given detailed notes on their grades to be viewed by their colleges and academic advisors.
  - Survey: Exam was harder than the practice exam, but for MCQs grades did not really differ. Free response wasn't there on the first midterm last year.
- MP4: Due Tuesday, 21st by 6 pm.
- Activities 6 and 7 will be released soon

Excel:

- Excel is a spreadsheet application
- Every cell is a variable
- Names are given by rows and columns (like C1 is column C and row 1).
- Some data shown in excel: days and money spent on those.

Programs in Excel:

To write a program you start with '=' and write something. Like B2+B4 will give you the addition of values stored in those two variables B2 and B4. All the cells with formulas are updated in real time. Functions are the core of excel.

1. `=SUM(num1,[num2],…)`
   - Takes in numbers as parameters
   - the parameters that are shown in [] are optional, i.e. you need at-least one parameter. So the number of variables required is changes depending on need
   - Returns the sum of numbers
   - You can put in the numbers, variables, ranges of numbers (`SUM(10,B1,B3:B5)`) etc.

2. `=COUNT(value1, [value2],…)`
   - Returns the number of cells that actually have data from the range of cells that the user inputs
   - `COUNT(B1:B100)` would return 5 if B1:B5 have data and others don't

3. `=AVERAGE(num1, [num2],…)`
   - Range of cell values to use is given
   - Returns the average of the data

4. `=SUMIF(range, criteria,[sum_range])`
   - Range: cell values to look at and see if they meet the criteria
   - Criteria: What are you checking the data in range against
   - sum_range: what data associated with range is to be added? (Optional parameter)

   Example: Money spent on Mondays

   ```
   =SUMIF(A1:A5,"Monday",B1:B5)
   ```

   - Monday is in quotes as it is not a number but a string.
   - It is effectively a for loop with a conditional

5. `=COUNTIF(range, criteria)`
   - Count the number of cells within the range that meet the criteria

   Example: How many days I spent at least $3.

   ```
   =COUNTIF(B1:B5,">=3")
   ```

   - Notice the use of "". Since >=3 is not a number, it has to be in quotes.

6. `=AVERAGEIF(range, criteria,[average_range])`
   - Similar to SUMIF
   - Range: data to look at and see if they meet the criteria
   - What are you checking the data in range against
   - average_range: what data associated with range is to be averaged? (Optional parameter)

   Example: What's the average I spent when I spent no more than $4?

   ```
   =AVERAGEIF(B1:B5,"<4",B1:B5)
   ```

Multiple Conditionals

7. `=SUMIFS(sum_range,criteria_range1,criteria1,[criteria_range2],[criteria2],…)`

Example: What is the total I spent on Mondays when I spent at least $3?

```
=SUMIFS(B1:B5,A1:A5,"Monday", B1:B5,">=3")
```

- Final result is the sum of money, so first argument is B1:B5, the range you want to sum over,
- Second is A1:A5, which is the criteria range, to see if the conditional/criteria that follows in the next argument is met by the criteria range or not.
- Similarly fourth and fifth arguments are criteria range and criteria to be checked within that range. Criteria are basically your conditionals.

8. `=AVERAGEIFS()`
   - Similar to SUMIFS

Example: What is the average I spent on Mondays when I spent more than the first monday?

```
=AVERAGEIFS(B1:B5,A1:A5,"Monday",B1:B5,">B1")
```
(This wont work)

- On Mondays and more than B1(money spent on first Monday) are the two conditionals.
- Division by zero encountered, because B1 is treated as a string.
- Checking a Boolean against a variable, the variable cannot be a string,
- Hence we must use: ">" & B1

```
=AVERAGEIFS(B1:B5,A1:A5,"Monday",B1:B5,">"&B1)
```

- The & combines strings(">") and variables (B1).