CS215 – CH 5D NOTES (5.12-5.14)

*List Comprehensions, Generator Expressions, Filtering/Mapping, Lambda Expressions*

**5.12 List Comprehensions**

* What is in the list?

list1 = [item - 5 for item in range (20, 26)]

[15, 16, 17, 18, 19, 20]

list2 = [item\*2 for item in range(10, 20) if item % 3 == 0]

[22, 30, 36]

* Use list comprehensions with filtering to create a second list called highGrades based on grades below. The list highGrades should only contain those grades which are at least 90.

grades = [68, 70, 82, 93, 77, 95, 88, 92, 73]

highgrades = [item for item in grades if item >= 90]

**5.13 Generator Expressions**

* Generator Expressions look like list comprehensions but you use parenthesis

Instead of brakcets

* List Comprehension is powerful because it gives us concise and convenient notation but list comprehensions are greedy, meaning, they create lists immideitly when you need them.
* On the other hand, generator expressions are lazy, meaning, they produce values as needed on demand.
* What is printed?

grades = [68, 70, 82, 93, 77, 95, 88, 92, 73]

average = statistics.mean(grades) #FYI: the average is 82

for grade in (grade for grade in grades if grade > average):

print(f"{grade}: Above Average")

* Create a generator expression in the blank below so that we get a list of all student names that begin with an “H” written with all letters in uppercase.

students = ["RuGGles", "gUpta", "hoUck", "LefeROVich", "HaMmarsten", "OwEns", "rYAn"]

hStudents = list(student.upper() for student in students if ‘h’ == student.lower()[0])

* Why do we need the “list” above? Related: How would you have done this with a list comprehension?

**5.14 Filter, Map, and ~~Reduce~~**

* Define a function startsH that takes in a string and returns true/false if it starts with an “H” or “h”.

startsH(stringy):

return string.lower()[0] == ‘h’

* Fill in the blanks to use the filter keyword to get all students whose names begin with h or H.

hStudents = list(filter(startsH,students))

* What if we also wanted to make our list all uppercase? We could use the map function to map an function called uppercase to the filtered list. (Define the uppercase method first. It should take in a string and return the uppercase version of it.)

hStudents = list(map(uppercase,

filter(startsH,student))

* A lamnda expression lets you create an inline function, so a quickie function that is not worth making a function definition for.
* Use a lambda function to get all students whose names begin with an r or R.

hStudents = list(filter(lamnda s: return s.upper()[0] == R,students))

* Use two lambda functions to get all students whose names begin with an r or R and to make these names all lowercase.

hStudents = list(map(lamnda s: s.upper(),

filter(lamnda s: return s.upper()[0] == R,students))