CS 116 Fall 2017 Midterm Exam
Reference Sheet

Some useful Python functions:

- `abs(x)` returns the absolute value of `x`.
- `m%n` returns the remainder when integer `m` is divided by positive integer `n`.
- `m/\ n` corresponds to integer division when `m` and `n` are both integers (that is, the quotient).
- `min(…)` returns the minimum value among its arguments (which may be numbers, strings, or a list).
- `max(…)` returns the maximum value among its arguments (which may be numbers, strings, or a list).
- `print(x,end=s)` prints `x` on a current line, followed by `s` (or followed by '\n' if `end` not specified).
- `check.expect(comment,value1,value2)` prints a summary message indicating if the test passed (if `value1 == value2`) or failed.
- `check.within(comment,value1,value2,tol)` prints a summary message indicating if the test passed (if `abs(value1 - value2) < tol`) or failed.
- `check.set_input(los)` sets up program to use strings in `los` when input is called by a function being tested.
- `check.set_screen(s)` prints `s` as expected output when a test is run.
- `type(x)` returns the type of value `x`. For example, you may check if `x` is of type Bool with `type(x)==type(True)`.
- `str(x), int(x), float(x), list(x)`.

String functions and methods in Python:

- `len(s)` returns the number of characters in `s`.
- `s[a:b]` returns a string containing the characters at positions `a, a+1,…,b-1` for `0 ≤ a ≤ b ≤ len(s)`. There is no error if `b > len(s)`.
- `s[a:b:c]` returns a string containing the characters at positions `a, a+c, a+2c,…`. The last character in the new string comes before position `b` in `s`.
- `s in t` returns `True` if string `s` occurs as a substring in `t`, and `False` otherwise.
- `s + t` returns a new string containing the characters of string `s` followed by the characters of string `t`.
- `input(p)` returns a string entered by keyboard input after the prompt `p` is displayed. Returned string does not include newline character.
- `s.count(c)` returns the number of times string `c` occurs in string `s` (could be 0).
- `s.format(v0,v1,…)` returns a string like `s`, except that `v0` replaces `{0}`, `v1` replaces `{1}`, etc.
- `s.find(t)` returns the index of the first occurrence of `t` in `s` (returns -1 if `t` is not a substring of `s`).
- `s.isalnum()` returns `True` if `s` is nonempty and all characters are alphabetical (letters) or numeric (digits), and `False` if the string is empty or it is nonempty and at least one character is not alphabetical or numeric.
- `s.isdigit()` returns `True` if all characters in `s` are digits ('0', '1', '2', '3', '4', '5', '6', '7', '8', '9'), and `False` otherwise. Returns `False` for the empty string.
- `s.islower()` returns `True` if all characters in `s` are lowercase, and `False` otherwise. Returns `False` for the empty string.
- `s.isupper()` returns `True` if all characters in `s` are uppercase, and `False` otherwise. Returns `False` for the empty string.
- `s.join(L), where L is a (listof Str),returns the string L[0]+s+L[1]+s+…+s+L[-1]`.
- `s.lower()` returns a string like `s`, except all uppercase characters are replace by lowercase versions.
- `s.replace(a,b)` returns a new string like `s`, except that all occurrences of `a` are replaced with `b`.
- `s.split()` returns a list of strings from `s`, by dividing `s` at whitespace. If `s` has value " my dog has fleas. 
then s.split() returns ["my", "dog", "has", "fleas."]
- `s.startswith(t)` returns `True` if string `s` begins with the string `t`, and `False` otherwise.
- `s.strip()` returns a string like `s`, but leading and trailing whitespace (including newline characters) are removed.
- `s.upper()` returns a string like `s`, except all lowercase characters are replaced by uppercase versions.
List functions and methods in Python:

- `len(L)` returns the number of values in `L`.
- `sum(L)` returns the sum of all entries in `L` (must be numbers).
- `L[a:b]` returns the list `[L[a], L[a+1], ..., L[b-1]]` for `0 \leq a \leq b \leq \text{len}(L)`. There is no error if `b > \text{len}(L)`.
- `L[a:b:c]` returns the list `[L[a], L[a+c], L[a+2*c], ...]`. The last item in the new list comes before position `b` in `L`.
- `list(map(func,lst))` returns the list that results from applying `func` to each element of `lst` (also works if `lst` is a string).
- `list(filter(func,lst))` returns the list of all elements of `lst` for which `func` returns `True` (also works if `lst` is a string).
- `x in L` returns `True` if `x` is an element of `L`, and `False` otherwise.
- `L+M` returns a new list containing the elements of the list `L` followed by the elements of the list `M`.
- `L.extend(M)` returns `None` and mutates the list `L` by adding the elements of list `M` to the end of list `L`.
- `L.append(x)` returns `None` and mutates the list `L` by placing the value `x` at the end of the list `L`.
- `L.index(x)` returns the smallest index `j` such that `L[j]=x` if `x` is in `L`, and results in an error if `x` is not in `L`.
- `L.insert(p,x)` returns `None` and mutates the list `L` by inserting `x` into position `p`, and keeping other values in `L` in the same relative positions.
- `L.remove(x)` returns `None` and mutates the list `L` by removing the first occurrence of the value `x`, and results in an error if `x` is not in `L`.
- `L.pop(k)` returns `L[k]` and mutates the list `L` by removing the value at position `k`, and results in an error if `k` is not a valid list position.
- `L.sort()` returns `None` and mutates the list `L` by sorting it into increasing order.
- `L.reverse()` returns `None` and mutates the list `L` by reversing the order of the elements.