BRONX COMMUNITY COLLEGE

of The City University of New York

DEPARTMENT OF MATHEMATICS and COMPUTER SCIENCE

CSI 33

Midterm Exam Sample/outline with Answers

1. (10 points) Answer True/False and Multiple Choice questions (5 questions)

2. (10 points) Given a program, find its asymptotic running time in theta-notation.
   see page 36/8 (it is from HW assignment)

3. (15 points) The integers $20, 12, 7, 14, 2, 5, 3$ and 8 are inserted in that order into a container object. Give the order in which these values are retrieved, if the container is

   (a) a stack,
      Answer: Stack is LIFO (Last In First Out), therefore the 8 will be retrieved first, then 3 and so forth. The elements will be retrieved in the following order: $8, 3, 5, 2, 14, 7, 12, 20$

   (b) a queue.
      Answer: Queue is FIFO (First In First Out), therefore since 20 was the first element to go into queue, it will be the first element to retrieve. The elements will be retrieved in the following order: $20, 12, 7, 14, 2, 5, 3, 8$

4. (10 points) Give the output of the following program and a pictorial representation of the memory at the stages 1, 2, and 3. (see CSI33-lecture06.pdf for example)

```
def f1(a,b,c):
    a.append(b)
    a.append(c)
    a = b+c
    b += 10
    print(a,b)
    return a

def main():
    x=[1]
    y,z = 10,20
```
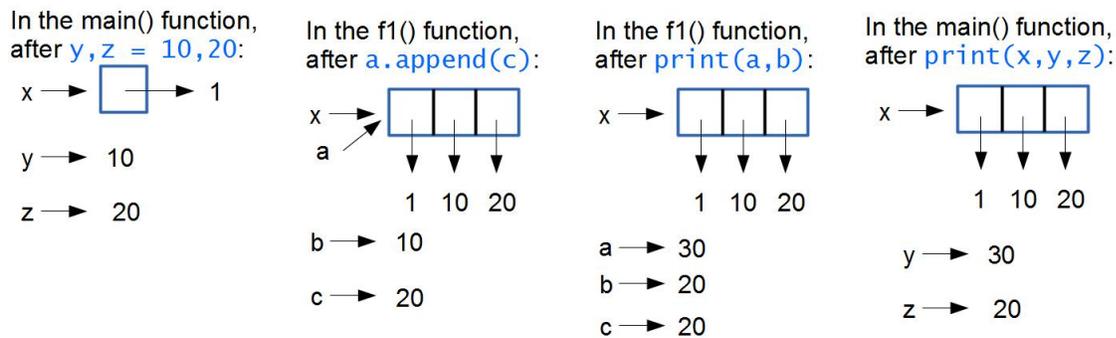
```
y = f1(x,y,z)
print(x,y,z)
```

Answer:

In the Python shell will be displayed the following:

```
30 20
[1,10,20] 30 20
```

Here is what will be happening in memory:

5. (15 points) one question from recursion chapter (6), like trace `recPower(3,6)` and figure exactly how many multiplications it does (see p.214/4)

   Answer: we did it in class, as in-class work (see 03/11 in Notes on our web-page).

6. (15 points) Given a `class` write unit tests for some of its methods/functions.

   Answer: See unit testing of Card class's method (02/09 in Notes), in-class work unit testing of two methods in Stack class (03/04), this is Section 2.6 from the book.

7. (25 points) Write a program (with specifications)