CSCI 101: Introduction to Computer Science

Exam 2

November 16, 2016

NAME:

To receive full credit you must clearly show all work and justify your answers. No books, notes, calculators, or cell phones are allowed during this exam. This is a 50 minute exam.

Question:	1	2	3	4	5	6	7	Total
Points:	15	20	10	10	10	10	0	75
Score:								

1. (15 points) Answer the following questions. Justify your answers.

   (a) What is a compiler?

   (b) What are the three registers in Pep/8's cpu?

   (c) What does the following spreadsheet function do?

   ```
   MIN(C2..C7)
   ```

   (d) In the following code, what is the boolean expression?

   ```
   while x < y:
        print x
        x = x + 1
   ```

   (e) In the following Python code, what are the variables?

   ```
   x = int(raw_input('Please enter a number: '))
   greeting = str('Hello')
   blue = 'blue'
   ```

2. (a) (5 points) Use the ASCII table to convert "Hi" into Hexadecimal.
   (b) (5 points) Write a Pep/8 machine language program to print "Hi"
   (c) (5 points) Write an Assembly language program to print "Hi"
   (d) (5 points) Write a Python program to print "Hi"

3. Consider the following Python code.

```
def fact(x):
    counter = 1
    product = 1
    while counter <= x:
        product = counter * product
        counter = counter + 1
    print x, 'factorial is equal to', product

print 'Welcome to factorial calculator'

n = int(raw_input('Please input a positive integer: '))
print 'We will find', n, 'factorial.'

fact(n)
```

(a) (5 points) Describe what each line of the code does.

(b) (5 points) If a value of 4 is inputed, what will be the program calculate?

4. Consider the following code for an Assembly language program in Pep/8.

```
           BR             main
diff:      .WORD          0x0000
num:       .BLOCK 3
limit:     .BLOCK 3

main:      DECI           limit,d
           DECI           num,d
           ADDA           num,d
loop:      DECI           num,d
           SUBA           num,d
           STA            diff,d
           CPA            limit,d
           BRLT           finish
           BR             loop
finish:    DECO           diff,d
           STOP
           .END
```

(a) (5 points) Describe what each line of the code does.

(b) (5 points) Describe what the program does.

5. Consider the following Python code:

```
x = int(raw_input('Please input a number: '))
y = int(raw_input('Please input another number: '))
product = x
counter = 1
while counter < y:
    product = counter * product
    counter = counter + 1
print product
```

The program should read in integers x and y and find x^y. However, when 2 is inputed for x and 3 is inputed for y, the program prints out 6 instead of 8.

(a) (5 points) Find and describe the error in the above program.

(b) (5 points) Correct the code so that it finds x^y for any inputed x and y.

6. (10 points) Write a Python program to draw an equilateral triangle using the turtle package. (**Hint:** The interior angles of an equilateral triangle are 60°.)

7. (10 points (bonus)) Write a Python program to draw a regular octagon (8 sided polygon with all angles of equal measure and all sides of equal length pictured below) using the turtle package.