University of Cape Town

Department of Computer Science

Computer Science CSC1010H

June Test

Thursday, 5 June 2014

Marks: 100

Time: 3 hours

- Approximate marks per question are shown in brackets
- The use of calculators is permitted

This paper consists of 8 questions and 10 pages (including this cover page).

Question	Marks	Internal	External	Question	Marks	Internal	External
1	12			5	6		
2	11			6	15		
3	10			7	12		
4	10			8	4		
Total				Total			
Grand Total							
Final Mark							
Internal Examiner:				External Examiner:			

Question 1.　[12 marks]

For all the statements below, give the output:

a) `print(24 - 3 * (4 + 8) / 2)`   _____   [1]

b)
```
b = 5
b **= 2
print(b)
```
_____   [1]

c) `print(6//4/2)`   _____   [1]

d)
```
i, j, k = 5, 7, 3
print((i > j) or not(j < k))
```
_____   [1]

e)
```
s = [2,3,6,8,5,4,1]
print(s[3:5])
```
_____   [1]

f) `print({3:'a',2:'b',1:'c',0:'d'}[1])`   _____   [1]

i)
```
p = 24
for q in range(6,0,-2):
    print(p//q)
```
_____

_____

_____   [3]

j)
```
s, t = 12, 2
while s > t:
    print(s%t)
    s -= 2
    t += 2
```
_____

_____

_____   [3]

Question 2.　[11 marks]

Answer the following questions:

a) Name an example of a popular operating system used today.

_____   [1]

b) Name the low-level programming language made up of 0s and 1s.

_____   [1]

c) Which standard Python module is used to import common mathematical functions?

_____   [1]

d) Which function is used to determine the length of a sequence?

_____   [1]

Insert the missing word:

e) The _____ Python data type stores numbers with fractional decimal values. [1]

f) The Python compiler typically reports on _____ errors. [1]

Indicate whether the following statements are True or False:

g) In Python it is possible to concatenate a string with an integer.

_____ [1]

h) In Python the standard number of spaces for indentation is 5 spaces.

_____ [1]

i) It is possible to change the elements of a Python tuple.

_____ [1]

j) For loops are referred to as definite loops.

_____ [1]

k) An elif statement, which forms part of an if statement, always needs a condition specified.

_____ [1]

Question 3.   **[10 marks]**

Consider the following Python program with line numbers and answer the questions below.

```
1.    def main():
2.        a = [12,6,34,21,9,25,16]
3.        b = (25,12,9,36)
4.        s = 0
5.        for i in a:
6.            if i in b:
7.                s += i
8.            else:
9.                print(str(i))
10.       print(str(s))
11.
12.   main()
```

a) What data type is the variable a on line 2?   _____   [1]

b) What data type is the variable b on line 3?   _____   [1]

c) Explain in your own words what this program does.

_____

_____

_____   [3]

d) What will the output of this program be?

_____

_____

_____

_____

_____

_____

_____   [5]

Question 4.   **[10 marks]**

Complete the program below. Prompt the user to enter a string. Calculate how many lowercase and how many uppercase characters are in the entered string, ignoring any other characters. Print out the number of lowercase and uppercase characters.

Here is an example of what the program should look like when it is run:

```
Enter string: Hello Thandi, welcome to Cape Town.
Lowercase characters: 24
Uppercase characters: 4
```

Hint: You may use the string methods which are described on the next page.

```
def main():
```

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____   [10]

_____

```
main()
```

Some of the Standard Python Methods for Strings

```
|  isalpha(...)
|      S.isalpha() -> bool
|
|      Return True if all characters in S are alphabetic
|      and there is at least one character in S, False otherwise.
|
|  islower(...)
|      S.islower() -> bool
|
|      Return True if all cased characters in S are lowercase and there is
|      at least one cased character in S, False otherwise.
|
|  isnumeric(...)
|      S.isnumeric() -> bool
|
|      Return True if there are only numeric characters in S,
|      False otherwise.
|
|  isspace(...)
|      S.isspace() -> bool
|
|      Return True if all characters in S are whitespace
|      and there is at least one character in S, False otherwise.
|
|  isupper(...)
|      S.isupper() -> bool
|
|      Return True if all cased characters in S are uppercase and there is
|      at least one cased character in S, False otherwise.
|
|  lower(...)
|      S.lower() -> str
|
|      Return a copy of the string S converted to lowercase.
|
|  swapcase(...)
|      S.swapcase() -> str
|
|      Return a copy of S with uppercase characters converted to lowercase
|      and vice versa.
|
|  upper(...)
|      S.upper() -> str
|
|      Return a copy of S converted to uppercase.
```

Question 5. [6 marks]

Find three errors in the Python code fragment below which would be generated by the Python compiler, indicating which line number it is on, as shown on the left. Also indicate what the error is, and explain how you would fix it:

```
1.     sum, count = 0, 0
2.     while(true):
3.         num = int(input('enter number(zero to end):'))
4.         if num == 0
5.             break
6.         sum += num
7.         count += 1
8.
9.     average = sum/count
10.    print('Average is ' + average)
```

_____

_____

_____

_____

_____

_____

_____ [6]

Question 6.   [15 marks]

Write a complete Python Turtle program which draws the exact pattern below. Use the turtle graphics functions to let the user enter the size of the lines as well as the colour of the lines. Also ensure the turtle window closes properly. Note: the smallest angle between each two adjacent lines is 60 degrees.
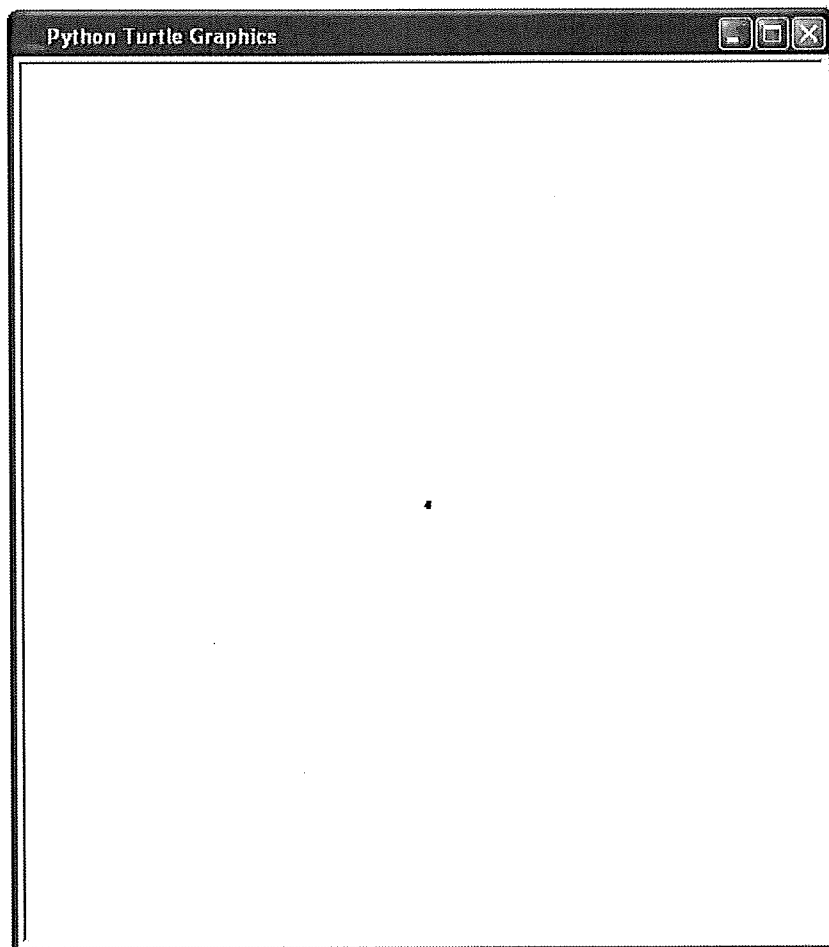

[15]
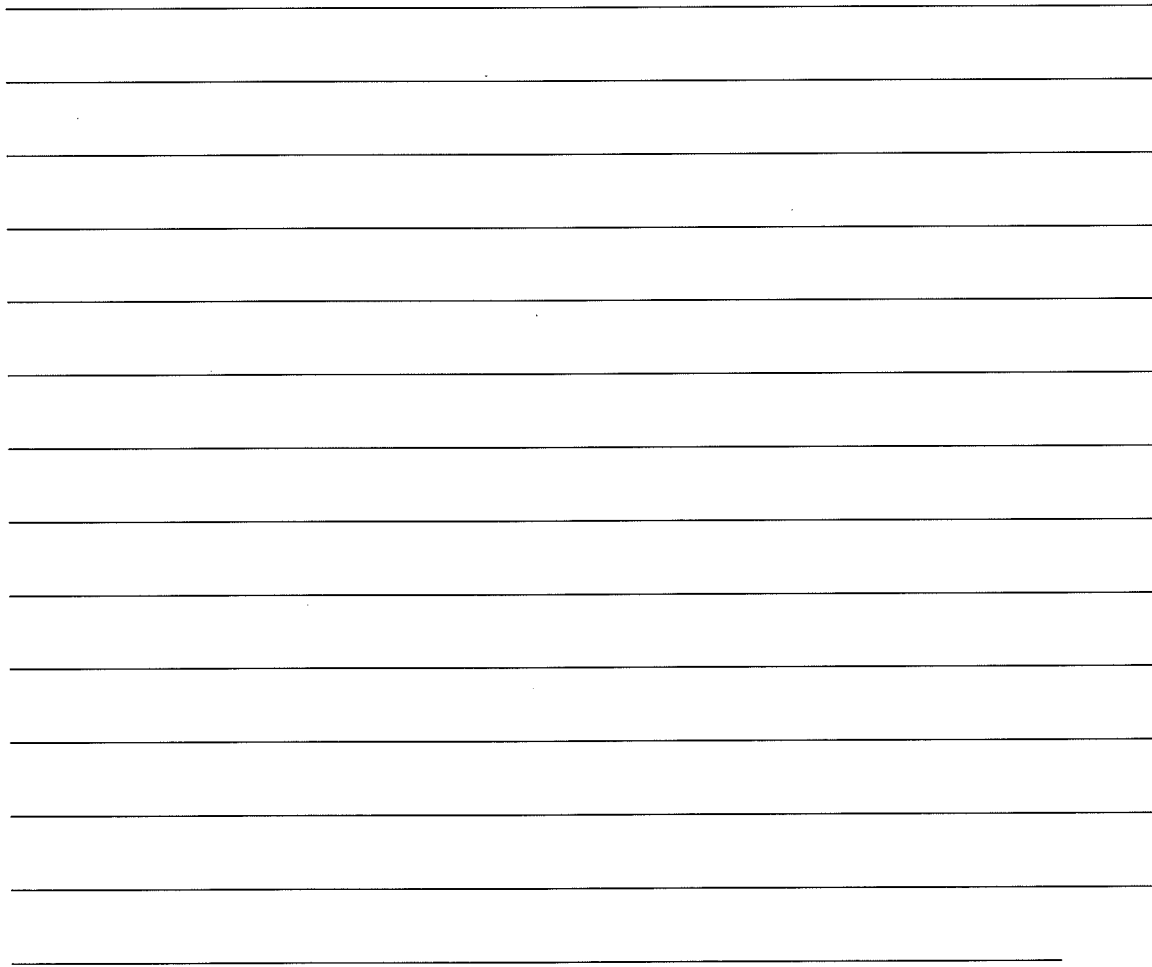
Question 7.   [12 marks]

Draw the output of the following program in the Turtle Graphics window provided below.

```
import turtle

def main():
    for size in range(20,140,20):
        for j in range(3):
            turtle.forward(size)
            turtle.right(120)
        turtle.right(60)
    turtle.exitonclick()

main()
```


[12]

Question 8.   [4 marks]

Consider the Python program below and answer the questions which follow:

```
import math

def main():
    print('*** Cylinder Calculator ***')
    val1 = int(input('Enter radius:'))
    val2 = int(input('Enter height:'))
    val3 = math.PI * val1 ** 2 * val2
    val4 = (2 * math.PI * val1 * val2) + (2 * math.PI * val1 ** 2)
    print('Cylinder volume is', val3)
    print('Cylinder surface area is', val4)

main()
```

Provide better, more descriptive names for the following identifiers, based on accepted Python coding conventions:

a) val1   _____   [1]

b) val2   _____   [1]

c) val3   _____   [1]

d) val4   _____   [1]