University of Cape Town ~ Department of Computer Science

Computer Science 1018F ~ 2008

Test 1

Question	Max	Mark	Internal	External
1	8			
2	4			
3	18			
TOTAL	30			

Marks : 30

Time : 40 minutes

Instructions:

    a) Answer all questions.

    b) Write your answers in the space provided.

    c) Show all calculations where applicable.

Question 1 [8]

a) Python is said to have strong and dynamic typing. What does this mean in practice?   [3]

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b) In what fundamental way does a tuple differ from a list?   [2]

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c) Write a Python statement that will print out *Hello World!*   [1]

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d) Why is whitespace considered significant in the Python programming language?   [2]

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Question 2 [4]

Consider the following program and answer the questions that follow.

```
def dosomething():

    a = raw_input()
    ai = int(a)
    b = raw_input()
    bi = int(b)
    c = raw_input()
    ci = int(c)

    x = (ai+bi+ci)/3;
    print x
```

a) What does this program do?   [2]

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b) What is the output if the input is the numbers 3, 5 and 5?   [1]

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c) How would you fix the calculation of the variable **x** so that the answer is not rounded off?[1]

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Question 3 [18]

Assume that an image composed of pixels in the range 0 (black) to 255 (white) is represented as a list of lists of integers, with each sublist representing a row of pixels.

a) Show how you would allocate an image with the above format to the variable img. The image has a 3x3 resolution and contains the following pixel data: [3]

```
  0    255  0
 255   255  255
  0    255  0
```

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b) Write a function **adjust(img, shift)** that will add the integer **shift** to the pixels of the image **img** and return the results as a new image. Your function should have a doc string and use for loops

[7]

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c) Add a check to make sure that shifted pixel values do not go outside the bounds [0, 255].   [4]

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d) Now rewrite the function Adjust (in part (b)) so that it uses list comprehension. Do not worry about including a doc string or the bounds check this time.   [4]

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