THE UNIVERSITY OF AUCKLAND

FIRST SEMESTER, 2014
Campus: City

COMPUTER SCIENCE

Principles of Programming

(Time Allowed: One Hour)

SECTION A
MULTIPLE CHOICE QUESTIONS

For each question, choose the **best** answer according to the information presented in lectures. Select your preferred answer on the Teleform answer sheet by shading in the appropriate box.

Question 1

[3.75 marks] Given the following Python code, which one of the following statements best describes what happens to the values stored in the variables?

```
today = wednesday
```

(a) The statement moves the value of variable `today` into variable `wednesday` leaving the value of variable `today` empty.
(b) The statement moves the value of variable `wednesday` into variable `today` leaving the value of variable `wednesday` empty.
(c) The statement tests if `today` and `wednesday` contain the same value or not.
(d) The statement copies the value of variable `today` into variable `wednesday` leaving the value of variable `today` unchanged.
(e) The statement copies the value of variable `wednesday` into variable `today` leaving the value of variable `wednesday` unchanged.

Question 2

[3.75 marks] What are the values of `girls`, `boys`, and `children` after the following code has been executed?

```
girls = 0
boys = 0
children = 0
children = girls + boys
girls = 15
boys = 12
```

(a) `15, 12, 0`
(b) `0, 0, 0`
(c) `15, 12, 27`
(d) `0, 0, 27`
(e) `0, 0, 1512`

Question 3
[3.75 marks] Assume that the Python variables `dog`, `cat` and `rabbit` have all been assigned integer values. Which one of the following would best describe the outcome of the following piece of code?

```
rabbit = dog
cat = rabbit
dog = cat
```

(a) Each variable would store the same value (the initial value of `rabbit`).
(b) The values in variables `rabbit` and `dog` would be swapped.
(c) Each variable would store the same value (the initial value of `dog`).
(d) The values in variables `cat` and `dog` would be swapped.
(e) The values in variables `rabbit` and `cat` would be swapped.

Question 4
[3.75 marks] Assume there are two Python string variables, `driver` and `navigator`. Which one of the following blocks of code will swap the values stored in those variables?

(a)
```
temp = navigator
driver = temp
navigator = driver
```
(b)
```
driver = navigator
navigator = temp
temp = driver
```
(c)
```
temp = navigator
driver = navigator
navigator = driver
```
(d)
```
temp = driver
driver = navigator
navigator = temp
```
(e)
```
driver = navigator
navigator = driver
```

Question 5
[3.75 marks] What does the following code print to standard output?

```
x = 0
x = x + 2
x = x + 4
x = x + 2
x = x + 0
print(x)
```

(a) `0`
(b) `2`
(c) `4`
(d) `6`
(e) `8`

Question 6
[3.75 marks] What does the expression `8 + 8 / 2 * 4` evaluate to?

(a) `2.0`
(b) `32.0`
(c) `48.0`
(d) `24.0`
(e) `9.0`

Question 7
[3.75 marks] What is the output of the following code?

```
blue = 0
red = 3
green = 2
purple = 6
brown = 1
print((brown + red) * blue + purple - green)
```

(a) `4`
(b) `16`
(c) `22`
(d) `5`
(e) `8`

Question 8
[3.75 marks] What does the expression `2 % 50` evaluate to?

(a) `25`
(b) `4`
(c) `2`
(d) `100`
(e) `50`

Question 9
[3.75 marks] What does the expression `7 // 2` evaluate to?

(a) `2`
(b) `3.5`
(c) `1`
(d) `7`
(e) `3`

Question 10
[3.75 marks] During labs, you experimented with the use of the `round()` function. Given what you learned in labs, what is the output from the following code?

```
x = round(2.5)
y = round(3.5)
z = round(3.4)
print(x, y, z)
```

(a) `2 4 3`
(b) `3 3 4`
(c) `2 3 3`
(d) `3 4 3`
(e) `3 4 4`

Question 11
[3.75 marks] Consider the Python code fragment below (with deliberately uninformative variable and function names).

```
def mystery(riddle):
    puzzle = 7
    enigma = 5
    conundrum = puzzle + riddle
    return conundrum + enigma
```

Which one of the following function calls will evaluate to `20` when executed?

(a) `mystery(7 + 5 + 8)`
(b) `mystery(1)`
(c) `mystery(6 + 2)`
(d) `mystery(20)`
(e) `mystery(2 + 0)`

Question 12
[3.75 marks] What is the output of the following code?

```
x = 23
result = 0
if x < 23:
    result = result + 1
elif x == 23:
    result = result + 2
elif x >= 23:
    result = result + 3
else:
    result = result + 4
print(result)
```

(a) `3`
(b) `4`
(c) `9`
(d) `5`
(e) `2`

Question 13
[3.75 marks] The following code should store the value `'voting age'` in `result` when `age` is at least `18`. Which expression should be used as the condition in the place of `<expression>` in the following code?

```
if <expression> :
    result = 'can't vote yet'
else:
    result = 'voting age'
```

(a) `age = 18`
(b) `age <= 18`
(c) `age < 18`
(d) `age >= 18`
(e) `age > 18`

Question 14
[3.75 marks] Consider the following block of Python code:

```
if num <= 0:
    print('A')
if num >= 10:
    print('B')
if num % 2 == 0:
    print('C')
```

Which of the following values for `num` would each cause `'C'` (and no other letter) to be printed?

(a) When `num` is `2, 4, 6,` or `8`
(b) When `num` is `2, 4, 6, 8` or `10`
(c) When `num` is `0, 2, 4, 6` or `8`
(d) When `num` is `0, 2, 4, 6, 8` or `10`
(e) When `num` is `0, 4, 6, 8,` or `10`

Question 15
[3.75 marks] Which value for `age` would result in the message `'Half price'` being printed when the following Python code is executed?

```
if age <= 6:
    message = 'Free entry'
elif age < 10:
    message = 'Half price'
else:
    message = 'Full price'
print(message)
```

(a) When `age` is `15`
(b) When `age` is `6`
(c) When `age` is `7`
(d) When `age` is `10`
(e) When `age` is `4`

Question 16
[3.75 marks] The following code determines the number of pizzas eaten by 10 people. What is the output of the code?

```
people = 10
if people < 5:
    pizzas = people
elif people < 10:
    pizzas = 3 * people // 4
elif people < 15:
    pizzas = 2 * people // 3
else:
    pizzas = people // 2
print(pizzas)
```

(a) 10
(b) 9
(c) 7
(d) 5
(e) 6

Question 17
[3.75 marks] What is the output of the following code?

```
my_list = [6, 2, 8, 2, 8]
new_list = []
for x in my_list:
    new_list = [x]
print(new_list)
```

(a) [8]
(b) [6, 2, 8]
(c) []
(d) [6, 2, 8, 2, 8]
(e) [6]

Question 18
[3.75 marks] What is the output of the following code?

```
my_list = [6, 2, 8, 2, 8]
new_list = []
for x in my_list:
    new_list = [x] + new_list
print(new_list)
```

(a) 26
(b) [8]
(c) [8, 2, 8, 2, 6]
(d) [26]
(e) [6, 2, 8, 2, 8]

Question 19
[3.75 marks] The function `max(a, b)` returns the largest of the values `a` and `b`. What is the output of the following code?

```
my_list = [4, 2, 5, 6]
m = 0
s = 0
for x in my_list:
      m = max(m, x)
      s = s + m
print(m, s)
```

(a) 6 24
(b) 6 19
(c) 4 24
(d) 0 0
(e) 4 16

Question 20
[3.75 marks] The following function has an error and returns the wrong result. Most of the doctests will fail (i.e. the result returned from the function will not match the answer expected by the doctest). However, one of the tests will pass. Which one of the doctest function calls will produce the same answer as expected?

```
def calculate_average(numbers):
    """Returns the average

    Arguments: numbers - a list of numeric values
    Returns: the average of the list of numbers given

    >>> calculate_average([0.0, 0.0, 0.0])
    0.0
    >>> calculate_average([3])
    3
    >>> calculate_average([4.0, 4.0])
    4.0
    >>> calculate_average([2, 3])
    2.5
    >>> calculate_average([1, 2, 3, 4])
    2.5
    """
    n = len(numbers)
    total = 0
    for element in numbers:
          total = element
    return total / n
```

(a) >>> calculate_average([0.0, 0.0, 0.0])
(b) >>> calculate_average([3])
(c) >>> calculate_average([1, 2, 3, 4])
(d) >>> calculate_average([4.0, 4.0])
(e) >>> calculate_average([2, 3])

Question 21: Tracing Code

In the box below, perform a code trace (similar to what you have done in labs) on the following function to show how the value of each variable changes.

```
def fun_with_variables():
    x = 3
    y = 4
    temp = x
    x = y
    y = temp
    a = 2
    b = 5
    a = b
    b = a
```

```
x = 3  4
y = 4  3
temp = 3
a = 2  5
b = 5  5
```

(9 marks)

Question 22: Write a Function

Complete the `convert_currency()` function below. This function accepts a list of values and an exchange rate, and creates a new list containing the original values converted into another currency. To convert the values in the list into the new currency, multiply each value by the exchange rate. The values in the new list should be rounded to 2 decimal places. Before returning the new list, your function should first print out the list of new values followed by the list of old values (as shown in the example in the doctest below).

```
def convert_currency(values, exchange_rate):

    """
    Converts a list of values from one currency to another
    Arguments: List of values (float)
    Returns:   List of values in the new currency (float)
    Prints:    The new list and the old list
    >>> convert_currency([100, 65.75, 1045.0, 134], 1.5)
    New List: [150.0, 98.62, 1567.5, 201.0]
    Old List: [100, 65.75, 1045.0, 134]
    [150.0, 98.62, 1567.5, 201.0]
    """
    new_list = []
    for value in values:
        new_list += [round(value*exchange_rate,2)]
    print ("New List:", new_list)
    print ("Old List:", values)
    return new_list

import doctest
doctest.testmod()
```

(10 marks)

Question 23: Understanding Python code

What is the output of the following Python program?

```
def will_pay(my_list,my_limit):
    my_sum = 0
    for amount in my_list:
        my_sum = my_sum + amount
    if my_sum <= my_limit:
        print("OK")
    else:
        print("No Way")


will_pay([2, 3, 4], 10)
will_pay([3, 3, 5], 10)
will_pay([2, 3, 5], 10)
```

```
OK
No Way
OK
```

(6 marks)

Rough Working – This page will not be marked