THE UNIVERSITY OF AUCKLAND

FIRST SEMESTER, 2015
Campus: City

TEST

COMPUTER SCIENCE

Principles of Programming

(Time Allowed: 75 Minutes)

NOTE**:**
- No calculators are permitted
- Compare the test version number on the Teleform sheet supplied with the version number above. If they do not match, ask the test supervisor for a new sheet.
- Enter your name and student ID on the Teleform sheet. Your name should be entered left aligned. If your name is longer than the number of boxes provided, truncate it.
- Answer Section A (Multiple choice questions) on the Teleform answer sheet provided. Answer Section B in the space provided in this booklet.
- Use a dark pencil to mark your answers in the multiple choice answer boxes on the Teleform sheet. Check that the question number on the sheet corresponds to the question number in this question book. If you spoil your sheet, ask the supervisor for a replacement.
- There is space at the back for answers that overflow the allotted space.

Surname	
Forenames	
Student ID	
Login (UPI)	

	Question	Mark	Out Of
1 - 23	Multiple Choice		69
24	Boolean expressions		6
25	Two functions		14
26	Code trace		11
	TOTAL		100

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 marks] Which of the following expressions produces the output below?

```
The value is 12
```

(a) `print('The value is' , '3' * 4)`
(b) `print('The value is ' + '3' * 4)`
(c) `print('The value is', 3 * 4)`
(d) `print('The value is ' + 3 * 4)`
(e) None of the above.

Question 2
[3 marks] What is the output of the following code?

```
print(int('Seven'))
```

(a) `Seven`
(b) ValueError: invalid literal for int() with base 10: 'seven'
(c) `77777`
(d) `7`
(e) None of the above.

Question 3
[3 marks] What is the output of the following code?

```
girls = 'doll'
boys = 'sport'
children = 'happy'
girls = children
children = 'gorgeous'
print(girls, boys, children)
```

(a) `happy sport gorgeous`
(b) `gorgeous sport gorgeous`
(c) `happy sport happy`
(d) `doll sport happy`
(e) None of the above.

Question 4

[3 marks] What is the output of the following code?

```
result = str(15 + 2) + " hello"
print(result)
```

    (a) `152 hello`

    (b) `17 hello`

    (c) `15`

    (d) `17`

    (e) None of the above.

Question 5

[3 marks] What does the expression `2 // 10 * 10.0 / 2.0` evaluate to?

    (a) 10

    (b) 1.0

    (c) 0.0

    (d) 5.0

    (e) None of the above.

Question 6

[3 marks] What is the output of the following code?

```
x = round(8.2)
y = round(8.9)
z = round(8.99, 0)
print(x, y, z)
```

    (a) 8 9 9

    (b) 8 8 8

    (c) 8 9.0 9.0

    (d) 8 9 9.0

    (e) None of the above.

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

```
s = " \tGood Morning\n"
print (s.strip(), end = "")
sum = 2 + 3
print(sum, end = "")
sum  = '2' + '3'
print(sum, end = "")
```

   (a) Good Morning235
   (b) Good Morning523
   (c) Good Morning55
   (d) Good Morning
      235
   (e) None of the above.

Question 8
[3 marks] Consider the code fragment below:

```
if number % 2 == 0:
    even = True
else:
    even = False
```

Which one of the following statements is equivalent to the code fragment above?

   (a) even == number % 2 = 0
   (b) even = number // 2 == 0
   (c) even = number % 2 = 0
   (d) even = number % 2 == 0
   (e) None of the above.

Question 9

[3 marks] Consider the function below:

```
def mystery(num1, num2):
    if (num1 >= 50 and num2 < 40):
        print('case 1')
        if (num1 > 50 or num2 < 30):
            print('case 2')
    else:
        print('case 3')
```

Which one of the following function calls will print 'case 1' only?

    (a) `mystery(50, 40)`

    (b) `mystery(50, 35)`

    (c) `mystery(55, 30)`

    (d) `mystery(50, 20)`

    (e) None of the above.

Question 10

[3 marks] What is the output when the following program is executed?

```
def mystery(number):
    value = 0
    word = str(number)
    position = 0
    while position < len(word):
        value = value + int(word[position])
        position += 1
    return value

def main():
    print(mystery(345))

main()
```

    (a) `12`

    (b) `345`

    (c) `012`

    (d) `543`

    (e) None of the above.

Question 11

[3 marks] What is the output of the section of code below?

```
num1 = 55
num2 = 43
is_bool1 = num1 > num2 and num1 - num2 < 10
is_bool2 = num1 < num2 or not (num1 - num2 < 10)
is_bool3 = not is_bool2
print(is_bool1, is_bool2, is_bool3)
```

    (a) True True False
    (b) False True False
    (c) True False False
    (d) False True True
    (e) None of the above.

Question 12

[3 marks] What is the output when the following program is executed?

```
def do_ifs(num1, num2, num3):
    if num1 > num2 and num2 < num3:
        print("A", end="")
    elif num2 > num3:
        print("B", end="")
        if num3 > num1:
            print("C", end="")
        if num2 > num1:
            print("D", end="")
        else:
            print("E", end="")
    else:
        print("F", end="")
    print("G")

def main():
    do_ifs(4, 2, 1)

main()
```

    (a) BEG
    (b) AG
    (c) BEFG
    (d) BE
    (e) None of the above.

Question 13

[3 marks] What is the output when the following program is executed?

```
def do_ifs(num1, num2, num3):
    if num1 > num2:
        print("A", end="")
    elif num2 <= 6:
        print("B", end="")
        if num3 < num2:
            print("C", end="")
        elif num2 > num1:
            print("D", end="")
        else:
            print("E", end="")
        print("F", end="")
    print("G")

def main():
    do_ifs(5, 1, 3)
    do_ifs(4, 4, 1)

main()
```

   (a) AG
       BCG
   (b) AG
       BCG
   (c) AG
       BCFG
   (d) A
       BCFG
   (e) A
       BCF

Question 14

[3 marks] What is the output of the section of code below?

```
for num in range(3, 10, 3):
    print(num, end = " ")
for num in range(25, 10, -5):
    print(num, end = " ")
```

   (a) 3 6 9 25 20 15 10
   (b) 3 6 9 12 25 20 15
   (c) 6 9 20 15 10
   (d) 3 6 9 25 20 15
   (e) 3 6 9 12 25 20 15 10

CONTINUED

Question 15
[3 marks] What is the output of the following code?

```
count = 50
while count > 36:
     count = count - 3
print("Count:", count)
```

    (a) Count: 34
    (b) Count: 36
    (c) Count: 35
    (d) Count: 33
    (e) None of the above.

Question 16
[3 marks] What is the output of the following code?

```
number = 20
count = 0
while number < 36:
     number = number + 2 + count
     count += 1
print("Count:", count)
```

    (a) Count: 5
    (b) Count: 7
    (c) Count: 6
    (d) Count: 4
    (e) None of the above.

Question 17
[3 marks] Which of the following outputs could have been produced by the following program?

```
import random

def main():
     for num in range(5):
          number = random.randrange(6, 15) + 2
          print(number, end = " ")

main()
```

    (a) 13 13 13 16 6
    (b) 13 9 7 16 12
    (c) 13 17 10 16 12
    (d) 13 8 13 16 15
    (e) All of the above could have been produced by the program

Question 18

[3 marks] What is the output when the following program is executed?

```
def main():
    a_list = [18, 33, 30, 35, 34]
    num1 = max(a_list[0], a_list[1])
    num2 = min(a_list[0], a_list[1])

    for i in range(2, len(a_list)):
        if a_list[i] > num1:
            num2 = num1
            num1 = a_list[i]
    print(num1, num2)

main()
```

(a) 35 33

(b) 35 18

(c) 34 33

(d) 35 34

(e) None of the above.

Question 19

[3 marks] What is the output when the following program is executed?

```
def main():
    list1 = [2, 1, 6]
    list2 = [7]
    list2 = list2 + list1 + [list1[1] + list1[2]]
    print(list2)

main()
```

(a) [7, 2, 1, 6, 1, 6]

(b) [7, 2, 1, 6, 3]

(c) [7, 2, 1, 6, 2, 1]

(d) [7, 2, 1, 6, 7]

(e) None of the above.

Question 20

[3 marks] Consider the function below:

```
def print_stuff(word, number, make_bigger):
    if make_bigger:
        word = word + word
        number = number * 2
    else:
        word = word[0: len(word) // 2]
        number = number // 2
    print(word, number)
```

Below are four function calls to the `print_stuff()` function above. Which of the following function calls gives the output:

```
hehe 12
```

   (a) `print_stuff("hello", 6, True)`
   (b) `print_stuff("he", 6, True)`
   (c) `print_stuff("he", 24, False)`
   (d) `print_stuff("hello", 24, False)`
   (e) None of the above.

Question 21

[3 marks] What is the output when the following program is executed?

```
def main():
    a_list = [3, 5, 7, 2, 8, 1]
    a_list[2] = a_list[3] + a_list[2]
    a_list[len(a_list) - 3] = a_list[1] - a_list[3]
    print(a_list)


main()
```

   (a) `[3, 5, 9, 1, 8, 1]`
   (b) `[3, 5, 7, -5, 8, 1]`
   (c) `[3, 5, 9, 3, 8, 1]`
   (d) `[3, 5, 9, 2, -4, 1]`
   (e) None of the above.

CONTINUED

Question 22

[3 marks] What is the output when the following program is executed?

```
def main():
    animal = "hippopotamus"
    some_animal = animal[:2] + animal[2:3] + animal[9:]
    print(some_animal)

main()
```

    (a) `hiimus`

    (b) `hipmus`

    (c) `hipmu`

    (d) `hipm`

    (e) `hippmus`

Question 23

[3 marks] Which of the following outputs could have been produced by the following program?

```
import random

def main():
    view = "breathtaking"
    pos1 = random.randrange(2, len(view) - 3)
    pos2 = random.randrange(2, len(view) - 3)
    letters = view[pos1] + view[pos2]
    print(letters)

main()
```

    (a) `ei`

    (b) `ra`

    (c) `ab`

    (d) `kk`

    (e) None of the above could have been produced by the program.

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SECTION B

Answer all questions in this section in the space provided. If you run out of space then please use the Overflow Sheet and indicate in the allotted space that you have used the Overflow Sheet.

Question 24:

a) Write a Python boolean expression which tests whether the length of the string `middle` is greater than the length of the string `first` and less than the length of the string `last`.

```
len(first) < len(middle) < len(last)
```

(3 marks)

b) Write a Python boolean expression which tests whether the value of the `int` variable `age` is between 21 and 39 both inclusive.

```
21 <= age <= 39
```

(3 marks)

Question 25:

a) Complete the `get_string()` function below which takes two integers as parameters and returns a string which contains zeros and ones; the number of zeros is given by the first parameter and the number of ones is given by the second parameter. For example, the following code:

```
print(get_string(3, 4))
print(get_string(0, 3))
```

will produce the output:

```
0001111
111
```

```
def get_string(zeros, ones):
```

```
  z_string = zeros * '0'
  o_string = ones * '1'
  return z_string + o_string
```

(6 marks)

b) Complete the `get_appointment_charge()` function which is passed an integer parameter, `minutes_taken`. The function returns the cost of the appointment which is calculated as follows:

CONTINUED

Every whole hour costs $90 and any extra minutes are charged at $1 per minute. The total cost is a maximum of $160, i.e., if the total cost is greater than $160, then the total cost is $160.

For example, the following program:

```
def get_appointment_charge(minutes_taken):
```

```
    hours = minutes_taken // 60

    minutes = minutes_taken % 60

    cost = hours * 90 + minutes

    cost = min(160, cost)

    return cost
```

(8 marks)

```
def main():
    print("130 minutes: $", get_cost(130), sep = "")
    print("150 minutes: $", get_cost(150), sep = "")
    print("50 minutes: $", get_cost(50), sep = "")
    print("25 minutes: $", get_cost(25), sep = "")
    print("61 minutes: $", get_cost(61), sep = "")

main()
```

prints:

```
130 minutes: $160
150 minutes: $160
50 minutes: $50
25 minutes: $25
61 minutes: $91
```
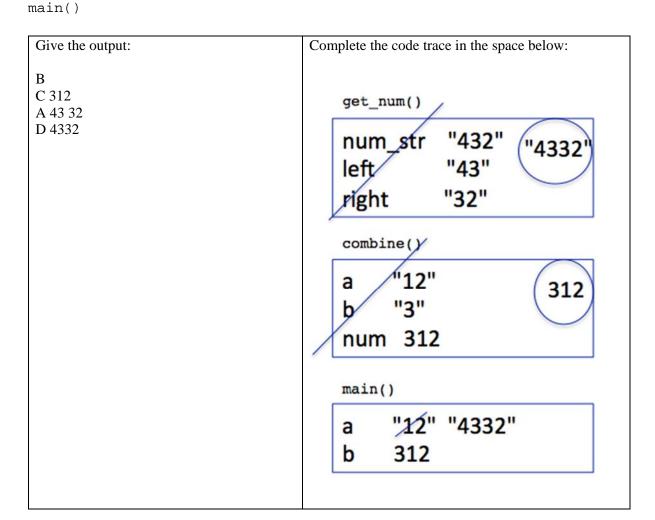
Question 26:

Using the code tracing technique shown in lectures, perform a code trace for the following program and give the output.   Give the output and show the code trace in the space below.

```python
def get_num(num_str):
    left = num_str[0:2]
    right = num_str[1:]
    print("A",  left, right)
    return left + right


def combine(a, b):
    num = int(b + a)
    print("B")
    return num


def main():
    a = "12"
    b = combine(a, "3")
    print("C",  b)
    a = get_num("432")
    print("D",  a)


main()
```

Give the output:	Complete the code trace in the space below:
B C 312 A 43 32 D 4332	

Question/Answer Sheet   ID …………...…………

(11 marks)

Question/Answer Sheet   ID …………………

- Overflow Sheet 1 -
Write the question number and letter next to your answer. You must ALSO indicate in the allotted space that you have used the overflow sheet.

- Overflow Sheet 2 -
Write the question number and letter next to your answer. You must ALSO indicate in the allotted space that you have used the overflow sheet.

_____
- Overflow Sheet 2 -
Write the question number and letter next to your answer. You must ALSO indicate in the allotted space that you have used the overflow sheet.