

The University of Melbourne
Department of Computing and Information Systems

ISYS90088

Introduction to Application Development

Sample exam* - Semester 2, 2016

***This is only a sample. Mark distribution for each question may vary and so could the number of questions in each section. The total marks for each section will be as shown in this sample.**

Identical examination papers: None

Exam duration: Three hours

Reading time: Fifteen minutes

Length: This paper has *five (5)* pages including this cover page.

No. of sections: Three

Authorized materials: No materials are authorized. Calculators are *not* permitted.

Instructions to invigilators: Students must not remove any part of the examination paper from the examination room. Students should be supplied with the exam paper and a script book, and with additional script books on request.

Instructions to students:

- This paper counts for 60% of your final grade.
- *All questions should be answered* by writing a brief response or explanation on the lined pages in the script book. The reverse side of any page may be used to make rough notes, or prepare draft answers.
- Use a blue or black pen (not a pencil).
- Please write your student ID below and on your script book.
- When you are finished, place the exam paper inside the front cover of the script book.

Library: This paper will *not* be held by the Baillieu library.

Student's ID number:

Examiners' use only:

Total [60]

Section A: [15 marks] – Answer all questions

1. [5 * 1 = 5 marks] Evaluate the following expressions, and provide the output in each case:
 - a. `2 * 'a'`
 - b. `str(2) + "easy"`
 - c. `"tom" not in "optimist"`
 - d. `"whatszzat"[1:][:3]`
 - e. `("{} was a racehorse, {} was one too".format(11, 22))`
2. [5* 1 = 5 marks] State whether the following statements are true or false:
 - a. A compound Boolean expression created with the `and` operator is true only when both sub expressions are true.
 - b. In a nested loop, the inner loop goes through all of its iterations for every single iteration of the outer loop
 - c. A string in Python is immutable
 - d. Lists in Python are immutable
 - e. The `append` method is used to add items to a list
3. [5 * 1 = 5 marks] Given the assignment `d = {"R": 0, "G": 255, "B": 0, "other": {"opacity": 0.6}}`, evaluate the following expressions, and determine: (a) the value the expression evaluates to; and (b) the final value of `d`. Assume that `d` is reset to its original value for each sub-question:
 - a. `d["R"]`
 - b. `d.pop("R")`
 - c. `d["H"]`
 - d. `d.keys()`
 - e. `d["H", "S", "L"] = [120, 98, 5]`

Section B: [20 marks] – Answer all questions.

4. [4 marks] What is wrong with this code? How can you fix it?


```
letter = input("Enter a letter: ")
if letter == 'a' or 'e' or 'i' or 'o' or 'u':
    print("vowel")
else:
    print("consonant")
```
5. [3 marks] Consider the following Python function.


```
def swap(a, b):
    temp = a
    a = b
    b = temp
```

 - (i) Explain why after a call of the form `swap(x, y)` the values of the variables `x` and `y` will be unaltered. Keep your answer brief.
 - (ii) Write a single statement that will swap the values of the variables `x` and `y` without using a temporary variable.
6. [3 marks] Rewrite the following function, replacing the while loop with a for loop, but preserving the remainder of the original code structure:


```
count = 0
items = ['eggs', 'spam', 'moreeggs']
while count < len(items):
    print("We need to buy {0}!".format(items[count]))
    count += 1
```

7. [4 marks] What is the output of the following code:

```
def mutate(x, y):
    x = x + "--The End--"
    y.append("The End")
    print(x)
    print(y)
mystr = "It was a dark and stormy night."
mylist = mystr.split()
mylist2 = mylist
mutate(mystr, mylist2)
print(mystr)
print(mylist)
```

8. [6 marks] Identify exactly 3 errors in the following code, determine for each whether it is a syntax, run-time or logic error, and provide a replacement line which corrects the error.

```
fun sqube(num):
    """is 'num' both the square and the cube of a natural no.?"""
    retval = False
    for sq in range(int):
        if sq**2 == num:
            retval == True
    for cb in range(num):
        if cb**3 == num:
            return retval
    return retval
```

Section C: [25 marks] – Answer all questions

9. [5 marks] Write a function `sqsum(n)` that takes a single positive integer `n` as an argument, and returns the sum of the squares of the integers from 1 to `n` inclusive, i.e. $\sum_1^n i^2$

10. [10 marks] Write a function `equiword(word)` that takes a single argument `word` (a non-empty string) and returns a (positive) integer `n` if all unique letters in `word` occur exactly `n` times, and `False` otherwise.

For example:

```
>>> equiword("intestines")
2
>>> equiword("deeded")
3
>>> equiword("duck")
1
>>> equiword("doggy")
False
>>> equiword("madam")
False
```

11. [10 marks] Two words are said to be anagrams of each other if all the letters of one word are present in the other word, and vice versa. For example: the words 'dog' and 'god' are anagrams of each other. Similarly, 'ate' and 'eat' are anagrams. Write a program in Python that accepts two inputs: one that accepts a word; and the other that accepts a sentence. Your program must print "True" if the word has an anagram in the sentence and "False" if not. To receive full marks, your code must be correct. Make sure that your program is appropriately commented. For example:

```
Enter a word: cat
Enter a sentence: I will act in a movie
True

Enter a word: dog
```

Enter a sentence: a dog is man's best friend
True

Enter a word: tac

Enter a sentence: tic tic tic