ST. PATRICK'S SCHOOL
PRELIMINARY EXAMINATIONS 2019
SECONDARY 4 EXPRESS

NAME

CLASS | INDEX NUMBER

COMPUTING **7155/02**

Paper 2 Practical (Lab-based) **2 September 2019**

2 h 30 min

Additional Materials:
- Electronic version of RESORT.xlsx data file
- Electronic version of DISARIUM.py file
- Electronic version of RATING.py file
- Insert Quick Reference Glossary (ANNEX A)

READ THESE INSTRUCTIONS FIRST

Write your name, class, index number in the spaces at the top of this page.
Write in dark blue or black pen.

Answer **all** questions.

All tasks must be done in the computer laboratory. You are not allowed to bring in or take out any pieces of work or materials on paper or electronic media or in any other form.

Programs are to be written in Python.
Save your work using the file name given in the question as and when necessary.

The number of marks is given in brackets [ ] at the end of each question or part question.
The total number of marks for this paper is 50.

Parent's Signature : _____

Date: _____

Remarks (if any) :

For Examiner's Use	
Marks	/50
Total	**%**

ANNEX A

Quick Reference for Python

This quick reference shows some examples of the Python language constructs. The complete Python language is not limited to these examples.

1. Identifiers

When naming functions, variables and modules, the following rules must be observed:

- Names should begin with character 'a' - 'z' or 'A' - 'Z' or '_'
  and followed by alphanumeric characters or '_'
  .
- Reserved words should not be used.
- User-defined identifiers are case sensitive.

2. Comments and Documentation Strings

```
# This is a comment

"""
   This is a documentation string
   over multiple lines
"""
```

3. Input/Output

```
print ("This is a string")

s = input ("Instructions to prompt for data entry.")
```

4. Import

import <module>

e.g. **import** math

5. Data Type

Data Type	Notes
int	integer
float	real number
bool	boolean
str	string (immutable)
list	series of values

6. Assignment

Assignment Statement	Notes
a = 1	integer
b = c	variable
d = "This is a string"	string
mylist = [1, 2, 3, 4, 5]	list or array

7. Arithmetic Operators

Operator	Notes
+ -	plus, subtract
* /	multiply, divide
%	remainder or modulus
**	exponential or power
//	quotient of the floor division

8. Relational Operators

Operator	Notes
==	equality
!=	not equal to
> >=	greater than, greater than or equal to
< <=	less than, less than or equal to

9. Boolean Expression

Boolean Expression	Notes
a and b	logical and
a or b	logical or
not a	logical not

10. Iteration

while loop	for loop
while condition(s): <statement(s)>	**for** i **in** range(n): <statement(s)>
	for record **in** records: <statement(s)>

ANNEX A

11. Selection

Type 1	Type 2	Type 3
if condition(s): <statement(s)>	**if** condition(s): <statement(s)> **else:** <statement(s)>	**if** condition(s): <statement(s)> **elif** condition(s): <statement(s)> **else:** <statement(s)>

12. Built-in Functions

(a) Basic functions

abs( )	chr( )	float()	input( )	int( )
ord( )	print( )	range( )	round( )	str( )
format( )				

(b) Mathematical functions

ceil( )	exp( )	fabs( )	floor( )	log( )
max()	min()	pow( )	sqrt( )	trunc( )

(c) String functions

endswith()	find()	isalnum( )	isalpha( )	isdigit( )
islower( )	isspace( )	isupper( )	len()	lower( )
startswith()	upper( )			

13. Reserved Words

Reserved words cannot be used as identifiers. They are part of the syntax of the language.

False	None	True	and	as
assert	break	class	continue	def
del	elif	else	except	finally
for	from	global	if	import
in	is	lambda	nonlocal	not
or	pass	raise	return	try
while	with	yield		

Task 1

A holiday resort, Red Resort uses spreadsheet software to calculate the cost of a holiday for each customer. The resort has five types of rooms and offers 20% discount for members. You are required to finish setting up the spreadsheet to calculate the cost for each customer.

Open the file **RESORT.xlsx**. You will see the following data.

Save the file as **NOVRESORT**_<Class>_<Class_Index_Number>_<Your_Name>

	A	B	C	D	E	F	G	H
1	**Red Resort Occupancy for Month of November**							
2								
3	**Customer First Name**	**Customer Last Name**	**Number of Nights**	**Room Type**	**Member**	**Cost**	**Discount**	**Total Cost**
4	Amber	Goh	2	Basic	Yes			
5	Arya	Jones	5	Deluxe	No			
6	Daniel	Lu	2	Family	Yes			
7	David	Lu	3	Suite	Yes			
8	David	Ferrarin	7	Deluxe	Yes			
9	Dylan	Chang	8	Premium	No			
10	Joy	Chua	3	Basic	No			
11	Malcom	Tan	6	Family	No			
12	Mena	Jan	7	Premium	Yes			
13	Michael	Khan	5	Premium	No			
14	Michael	Kaur	2	Deluxe	Yes			
15	Mollie	Cooke	4	Family	No			
16	Pascal	Han	3	Family	No			
17	Ken	Phillips	5	Deluxe	Yes			
18	Venkhat	Singh	4	Premium	Yes			
19								
20	**Number of Customers**				**Average Revenue**			
21	**Number of Members**							
22								
23								
24		**Room Type**						
25		**Basic**	**Family**	**Deluxe**	**Premium**	**Suite**		
26	**Cost per Night**	$82	$108	$115	$120	$200		
27								

1 In cell **C20** enter a formula to count the number of customers. [1]

2 In cell **C21** enter a formula to count the number of Members. [1]

3 Use an appropriate function to search for the **Cost per Night** in the **Room Type** table, and use it to complete the **Cost** column. The cost must take into consideration the **Number of Nights** each customer is staying. [2]

4 Use a conditional statement to identify whether a customer will receive the **Discount**. Only members will receive a 20% discount and the corresponding cells must display this discount. [2]

5 Use a conditional statement to calculate the total cost of each customer's stay at the resort in the **Total Cost** column. The **Total Cost** must take into account any discount given to the customer. [2]

6 In cell **H20** enter a formula to calculate the average revenue for the month. If the average revenue exceeds $400, use conditional formatting to fill cell **H20** with green colour. [2]

Task 2

At a particular company, employees are rated at the end of each year. The rating scale begins at 0.0, with higher values indicating better performance and resulting in larger raises. The value awarded to an employee is either 0.0, 0.5, or 0.6. Values between 0.0 and 0.5, and between 0.5 and 0.6 are never used. The meaning associated with each rating is shown in the following table. The amount of an employee's raise is $2600.00 multiplied by their rating.

Rating	Meaning
0.0	Unacceptable performance
0.5	Acceptable performance
0.6	Satisfactory performance

The program below displays whether an employee's performance rating and his raise based on the rating entered by the user.

```
RAISE_FACTOR = 2600.00
D = 0.0
C = 0.5
B = 0.6

rating = float(input("Enter the rating: "))

if rating == D:
      performance = "Unacceptable"
elif rating == C:
      performance = "Acceptable"
elif rating == B:
      performance = "Satisfactory"
else:
      performance = ""

if performance == "":
      print("Invalid rating.")
else:
      print("Based on that rating, the performance is %s." % performance)
      print("The employee's raise is $%.2f." % (rating*RAISE_FACTOR))
```

Open the file **RATING.py**.

Save the file as **PERFORMANCE**_<Class>_<Class_Index_Number>_<Your_Name>**.py**

7 Edit the program so that:

(a) If the rating is A, the performance is "Meritorious", where rating A means 0.7 or more. [2]

(b) It prompts the user to enter the name of the employee and displays this name before it outputs the performance category and raise. [2]

(c) When an invalid rating is entered, the program displays an error message and prompts the user to re-enter using the correct rating. [3]
Save your program.

8 Save the file as **VARPERFORMANCE**_<Class>_<Class_Index_Number>_<Your_Name>**.py** [3]
Edit your program so that it works for any number of employees, as determined by the user.

Task 3

A number is said to be the Disarium number when the sum of its digits raised to the power of their respective positions becomes equal to the number itself.

For example, 175 is a Disarium number as follows:

$1^1 + 7^2 + 5^3 = 1 + 49 + 125 = 175$

A computing student wrote the following program to display the list of disarium numbers from a user-defined range of numbers. However, there are syntax and logical errors in the program.

```
result = []

limit = int(input("Range of numbers to be tested is 1 to n inclusive. State
your n: ")
print("The program is now checking for disarium numbers from 1 to
{}...".format(limit))

for number in range(1, limit+1)

    remaining = 0
    sum_digits = 0
    number_str = number
    counter = len(number_str)
    test_number = number

    while number > 0:
        remaining = test_number%10
        sum_digits += (remaining*counter)
        test_number = test_number/10
        counter -= 1

    if sum_digits == number:
    result = result.append(number)

    print("The disarium numbers between 1 to {} are {}: ".format(limit,
result))
```

Open the file **DISARIUM.py**.

Save the file as **DISARIUM_LIST**_<Class>_<Class_Index_Number>_<Your_Name>**.py**

9 Identify and correct the errors in the program so that it works according to the criteria given. [10]

Save your program.

Task 4

You have been asked to create a program to determine the type of integer triangle from a given set of dimensions. Your program should:

- Accept 3 integer lengths (in cm) of the desired triangle as input in the format `a, b, c`.
- Validate that there are exactly 3 positive integers in the input, and asks the user to re-enter the input where necessary.
- Determine the type of triangle based on the input.

Type of Triangle	Condition	Output
Invalid	The longest side of the triangle is greater than the sum of its two shorter sides	The dimensions provided cannot form a triangle.
Equilateral	All 3 sides are identical in length	You have entered an equilateral triangle.
Isosceles	Only 2 of the 3 sides are identical in length	You have entered an isosceles triangle.
Scalene	All sides are different in length	You have entered a scalene triangle.

10 Write your program and test that it works.
Save your program as [10]
MYTRIANGLES1_<Class>_<Class_Index_Number>_<Your_Name>**.py**

11 When your program is complete, test it for the following:

	Side Input	Expected Output
Test 1	2, 4, 10	The dimensions provided cannot form a triangle.
Test 2	6, 6, 6	You have entered an equilateral triangle.
Test 3	10, 6, 6	You have entered an isosceles triangle.
Test 4	3, 4, 5	You have entered a scalene triangle.

Take a screenshot of each of the above four tests and save as
TEST_<Test_Number>_<Class>_<Class_Index_Number>_<Your_Name> in either **.png** or **.jpg** format. [5]

12 It is known from the converse of Pythagoras' theorem that a triangle is right-angled if the sum of the squares of its two shorter sides adds up to the square of its longest side.

It follows that a triangle is obtuse if the sum of the squares of its two shorter sides is smaller than the square of its longest side.

Modify the program such that in addition to the aforementioned categories, it should also state in its output if the triangle happens to be right-angled or obtuse.

Save your program as [5]
MYTRIANGLES2_<Class>_<Class_Index_Number>_<Your_Name>**.py**

End of Paper