الجامعة الوطنية
National University
Science & Technology للعلوم والتكنولوجيا
كلية عمان البحرية الدولية
International Maritime College Oman

ACADEMIC YEAR 2023 - 2024

Program	Year	Semester	Paper
PE	**1**	**2**	**Midterm**

MODULE NAME:	**Computer Applications**		
MODULE CODE:	**TCOMP**	**EXAM DATE:**	**25 Mar 2024**
INSTRUCTOR's NAME:	**Dr. Amer Alhabsi**	**DURATION:**	**1.5 hrs.**

Questions to be answered on:	**Allowed tools:**	**Number of pages**
✓ Space provided on the question paper + submission of file to Moodle	Pen, Pencil & Calculator, Computer, Jupyter Notebook	(Incl. cover page)**:** **4**

Points of attention:

- For each question, the maximum earned points are mentioned between brackets at the end of each question.
- Write very clearly! Answers that are not readable are not marked and don't get points!
- Make sure your answers are written to the point.
- All answers should be written **in English.**
- Write all the answers in **blue or black pen only.**
- Use the **pencil** only for **diagrams & graphs.**
- Show all the calculation steps in the given space.
- When finished submit the question paper, together with the answer scripts and the signed cover page to the invigilator.
- Any cheating/copying may result in an instant failing of the examination.

STUDENT NAME:

STUDENT ID:

FINAL MARKS

	40
	10

Number of answer scripts:……..…….

Invigilator:……..……..…

Student's signature: ……

Time of receipt:……..…..

Q1: **[10 pts]** Write a program in Python and test it with 3 sets of data. The program takes two integer values **a** and **b**. It calculates and prints *Z* based on the conditions in the table below.

a	**b**	***Z***
even	b < 7	$Z = \pi(a+b)^2$
even	b ≥ 7	$Z = \frac{a+b}{a+4}$
odd	b < 7	$Z = \sin(a+b)$
odd	b ≥ 7	$Z = \frac{\sqrt{a+1}}{b+1}$

Q2: [10 pts] Write a Python program that displays the angle in degree 0, 10, 20, …, 90, the sine of the angle and the cosine of the angle. Separate the entries with a Tab character. The table should look like:

angle	sin	cos
0	0	1
10	0.1736	0.9848
20	0.342	0.9396
…	…	…
90	..	..

Q3: [10 pts] Trace the following one program. Write the value of all variables, next to the code. If unknown, write **?**. Also show the output of the program.

	a	b	c

`a = 3`
`b = 5`
`c = a + b + 1`
`print("c = ", c)`
`if c > 9:`
`  a = a + 1`
`  b = c`
`  print(a)`
`else:`
`  a = a - 1`
`  b = c - a`
`  print(b)`
`print(a+b)`
	……..
	……..
	……..
	……..
	……..
	……..
	……..
	……..
	……..
	……..
	……..
		……..
		……..
		……..
		……..
		……..
		……..
		……..
		……..
		……..
		……..
		……..
			……..
			……..
			……..
			……..
			……..
			……..
			……..
			……..
			……..
			……..
			……..

Output:

Q4: **[10 pts]**

(a)Write a function in Python that takes 2 integers, *x* and *y*. The function compares the difference of these integers to the number 5. If the difference of (*x* and *y)* is smaller than 5 the function returns 0. Otherwise, it returns 1.

(b) Write a main program to test the above function. The main function calls the function 1000 times. In each time the function generates two numbers between 1 and 6 randomly. These numbers are used as parameters to call the function in part (a). Finally, the program prints how many times the condition occurred.

Common Constructs that you may or may not need.

To use math module:
```
import math
```

Common functions: `math.sqrt(), math,exp(), math.sin()`

To use the random number generator:
```
import random
```

Common functions:
```
random.randint(a, b)
```

MLO & Bloom's Level of Complexity

Q #	MLO Addressed	Complexity Level	Mark	Remark
1	**4**	Analysing		
2	**3**	Application		
3	**4**	Analysing		
4	**4**	Creating		