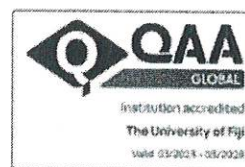




The University of Fiji
(An Entity of Arya Pratinidhi Sabha of Fiji)



SCHOOL OF SCIENCE AND TECHNOLOGY

Semester 1, 2025

FINAL EXAMINATION PAPER



**ITC115: INTRODUCTION TO SOFTWARE
ENGINEERING**

Important Instructions to Students:

1. Read the questions, instructions carefully and answer the questions.
2. You are allowed an **extra 10 minutes reading time** (during this time, you are not allowed to write with pen) and **180 minutes (3 Hours) to complete this paper**.
3. Silent, non-programmable calculators are allowed, but not supplied.
4. Write all your answers in the answer booklet provided. If you need extra sheets, please ask from the supervisor. Write your name, course code and student identification number in the answer booklet and in the attendance sheet.
5. This paper contains three (3) sections A, B and C. All questions are compulsory to answer.
6. Write all your answers legibly. The marker has the right to award zero for answers that are not legible.
7. This is a **Closed Book Examination**. The University views plagiarism, cheating and dishonest practice as serious offences and if found, offenders are penalized.

Examination Paper Content (Format):

<u>Section</u>	<u>Question</u>	<u>Content</u>	<u>Marks</u>	<u>Suggested Time</u>
A	1-20	Multiple Choice Questions	20	36 minutes
B	21-29	Programming Questions	35	63 minutes
C	30-45	Open-Ended Questions	45	81 minutes
		TOTAL	100	180 Minutes

*Registered with the Fiji Higher Education Commission as a University under the Higher Education Act 2008.
Registration Certificate Number (RGN0020/11)*

1. Consider the following code segment:

```
number = 10
while number >= 0:
    print(number, end=" ")
    number = number - 2
```

What is the output produced by this code?

- A. 10 8 6 4 2 0
- B. 10 8 6 4 2
- C. 0 2 4 6 8 10
- D. 10 9 8 7 6 5 4 3 2 1 0

2. What will be the value of the variable result after the following code is executed?

```
result = 1
for i in range(1, 5):
    result = result * i
```

- A. 4
- B. 5
- C. 24
- D. 120

3. A conditional statement allows a program to:

- A. Repeat a block of code multiple times.
- B. Perform different actions based on whether a condition is true or false.
- C. Store and manipulate collections of data.
- D. Define reusable blocks of code.

4. Consider the following code segment:

```
age = 18
if age >= 16:
    print("Eligible to drive")
else:
    print("Not eligible to drive")
```

What will be printed when this code is executed?

- A. Eligible to drive
 - B. Not eligible to drive
 - C. Nothing will be printed
 - D. An error will occur
5. When the range() function is called with three arguments, what does the third argument specify?
- A. The starting value of the sequence.
 - B. The ending value of the sequence (exclusive).
 - C. The step (increment or decrement) between numbers in the sequence.
 - D. The total number of elements in the sequence.
6. Which of the following is a valid way to check if a variable x is greater than 10 and less than 20?
- A. $x > 10$ and $x < 20$
 - B. $x > 10$ or $x < 20$
 - C. $x > 10$ and < 20
 - D. x is greater than 10 and less than 20
7. What is the primary purpose of testing a program with a variety of inputs?
- A. To make the code run faster.
 - B. To ensure the code is easy to read.
 - C. To identify and fix errors or bugs in different scenarios.
 - D. To reduce the size of the program.
8. Which of the following is the correct way to assign the string "Hello\nWorld" to a variable named message such that the newline character is interpreted?
- A. message = 'Hello\\nWorld'
 - B. message = "Hello\\nWorld"
 - C. message = ""Hello World""
 - D. message = 'Hello' + '\n' + 'World'

9. What is the symbol used for single-line comments in Python?
- A. //
 - B. /* ... */
 - C. #
 - D. --
10. What is the result of the expression $5 + 2 * (10 - 4) / 3$ using the standard order of operations?
- A. 9
 - B. 17
 - C. 19
 - D. 14
11. In Python, how do you access the element at index 3 of a list named `my_list`?
- A. `my_list[3]`
 - B. `my_list(3)`
 - C. `my_list.get(3)`
 - D. `my_list{3}`
12. Which of the following is a benefit of using functions in programming?
- A. It makes the code run faster.
 - B. It reduces code redundancy and improves organization.
 - C. It automatically handles errors.
 - D. It allows direct manipulation of hardware.
13. Which of the following is a common type of software testing performed by end-users before final release?
- A. Unit testing
 - B. Integration testing
 - C. Acceptance testing
 - D. Performance testing
14. What is an algorithm in computer science?
- A. A specific programming language.
 - B. A step-by-step procedure for solving a problem.
 - C. A hardware component of a computer.
 - D. A type of software license.

15. What is the purpose of the return statement in a function?

- A. To define a variable within the function.
- B. To exit the function and optionally send a value back to the caller.
- C. To print output to the console.
- D. To start a loop.

16. What is the role of a compiler in the software development process?

- A. To execute code line by line.
- B. To translate source code into machine code.
- C. To manage project files.
- D. To test the software for bugs.

17. What is a variable in programming?

- A. A fixed value that cannot be changed.
- B. A named storage location that can hold a value.
- C. A type of loop.
- D. A function without a name.

18. The Agile methodology emphasizes:

- A. Strict adherence to a predefined plan
- B. Iterative development and continuous feedback
- C. Comprehensive documentation before coding begins
- D. Waterfall-style sequential development

19. Which of the following best describes code refactoring?

- A. Adding new features to existing code
- B. Restructuring existing code to improve readability and maintainability without changing functionality
- C. Fixing bugs and errors in the code
- D. Writing code from scratch for a new functionality

20. In software engineering, what is a “user story” typically used for?

- A. Writing technical documentation
- B. Defining the requirements and features from the user’s perspective
- C. Designing the user interface
- D. Managing project finances

21. Write the outputs of the following code snippets:

```
i. num = 0
   while num < 5:
       print(num * 2, end=" ")
       num += 1
```

[2 marks]

```
ii. for i in range(5, 0, -1):
     print(i, end="-" )
```

[2 marks]

```
iii. value = 12.3456
     print("%.2f" % value)
```

[1 mark]

22. Explain the purpose of the following functions:

[4 marks]

- i. print()
- ii. int()
- iii. float()
- iv. input()
- v. pop()
- vi. round()
- vii. len()
- viii. range()

23. Convert the below algorithm into python code:

[3 marks]

set the product to 1.0
input a number as a string

while the string is not "0":
 convert the string to an integer
 multiply the product by the integer
 input another number as a string

print the product

24. Write a program that asks the user to enter the prices of three different items they wish to purchase. Use a loop to get the price for each item. After receiving the prices, calculate the total cost of all the items. Then, apply a discount of 10% if the total cost is \$100 or more. Finally, display the original total cost and the final cost after any discount is applied.

[4 marks]

25. Assume that the variable data refers to the string "myprograms.exe". Write the values of the following expressions: [2 marks]

- i. data[2]
- ii. data[-1]
- iii. len(data)
- iv. data[0:8]

26. Assume that the variable data refers to the string "myprograms.exe". Write the expressions that perform the following tasks: [3 marks]

- i. Extract the substring "gram" from data.
- ii. Truncate the extension ".exe" from data.
- iii. Extract the character at the middle position from data.

27. Write **functions** to do the following:

- i. Accept two floating-point values as arguments. Display the values formatted with two digits to the right of the decimal. [2 marks]
- ii. Accept three int arguments and return their average. [2 marks]
- iii. Accepts sales amount and a tax rate, calculate and displays the sales tax. Write two methods: one to calculate the sales tax and second to display the sales tax. [3 marks]
- iv. Results have been calculated for bounsAmount and sales. Write a function definition that accepts these values as input for display purposes. [1 mark]

28. Write a loop that prints your name 50 times. Each output should begin on a new line. [2 marks]

29. Create a program that presents the user with the following menu of options:

- 1. → Calculate the square of a number
- 2. → Calculate the cube of a number
- 3. → Exit

The program should then repeatedly ask the user to enter their choice (1, 2, or 3).

- If the user enters 1, the program should ask for a number and then display its square.
- If the user enters 2, the program should ask for a number and then display its cube.
- If the user enters 3, the program should terminate.
- If the user enters any other number, it should display an "Invalid choice" message and prompt the user.

[4 marks]

30. Elaborate on the importance of software documentation throughout the software development lifecycle. [3 marks]
31. Distinguish between a software defect and a software failure. [1 mark]
32. Define the concept of software refactoring and explain its primary goal. [2 marks]
33. Explain the component-based software engineering method. [2 marks]
34. Differentiate between the waterfall development process and the incremental development process. Explain two benefits of the incremental software development process. [3 marks]
35. Explain the requirements engineering process. [3 marks]
36. Differentiate between architectural design and interface design. [1 mark]
37. Differentiate between unit testing and integration testing. Why are both important for ensuring software quality? [1 mark]
38. Write a paragraph explaining agile software development and its manifesto. In addition to that explain the principles of agile software development. [4 marks]
39. Suggest three reasons why the productivity rate of programmers working as a pair might be more than half that of two programmers working individually. [3 marks]
40. Considering the increasing prevalence of Artificial Intelligence (AI), outline at least five major effects it has had on the software engineering discipline, encompassing tools, processes, and required skills. [5 marks]
41. Discuss the circumstances under which a plan-driven software development process might be more suitable than an agile approach. [3 marks]
42. Explain why understanding the non-functional requirements is as crucial as understanding the functional requirements in software engineering. [2 marks]
43. The Scrum approach is a general and one of the most used agile methods. Elaborate on the approach explaining the different scrum ceremonies. [3 marks]
44. Suggest three reasons why code reviews are considered a valuable practice in software development, even when developers are experienced. [3 marks]
45. Based on your experience with an online shopping website, identify three key use cases and sketch a high-level sequence diagram for the "place order" use case. [6 marks]

End of Exam.

