

PAN AFRICA CHRISTIAN UNIVERSITY

DIPLOMA IN INFORMATION, COMMUNICATION AND TECHNOLOGY

END OF SEMESTER EXAMINATION

DEPARTMENT: COMPUTING AND INFORMATION TECHNOLOGY
COURSE CODE: DICT0113
COURSE TITLE: PRINCIPLES OF PROGRAMMING AND ALGORITHMS
CAMPUS: ROYSAMBU
EXAM DATE: MONDAY 2nd DECEMBER ,2024
TIME: 2:00PM -5:00PM

INSTRUCTIONS

- This exam script has **TWO (2)** sections.
- Read all questions carefully before attempting.
- Answer All questions in Section **A** and any other Three questions in Section **B**.
- Write only your **student number** on the answer booklet provided.

SECTION A

(Answer ALL questions in this section)

Question 1:

- a)** Define syntax and semantics of programming languages. **[2 Marks]**
- b)** Algorithms are essential in developing good programs. Name two characteristics of a good algorithm. **[2 marks]**
- c)** Explain What constitutes a programming environment? **[3 marks]**
- d)** Primitive data types are the most basic data types in any programming language. State three primitive data types used in programming. **[3 marks]**

SECTION B

(Answer any THREE (3) questions in this section)

Question 2:

- a)** Programming paradigms are the fundamental styles and approaches that guide the organization, structure, and execution of computer programs. Briefly discuss the following programming paradigms. **[4 marks]**
 - i. Structured programming
 - ii. Object-oriented programming
- b)** Using an example, illustrate the nested if...else statement. **[6 marks]**

Question 3:

- a)** Develop a C program that utilizes a while loop to systematically list and display all odd numbers within the range of 0 to 50. **[4 marks]**
- b)** In large scale programming environment, version control systems are used to manage code modifications, track project history, and revert to previous versions when necessary. Briefly discuss the three types of version control systems. **[6 Marks]**

Question 4:

- a)** Compilation in programming is the process transform high-level source code into machine-executable code. Discuss the three stages of a program compilation process. **[6 Marks]**
- b)** Identify the errors in the following program: **[4 marks]**

```
#include<stdio>

int main () {
    int a = 5;
    switch (a) {
        case 1:
            printf("First")
        case 2:
            printf("Second")
        case 3 + 2:
            printf("Third")
        case 5:
            printf("Final")
            break;
    }
    return 0;
}
```

Question 5:

- a) Develop a C program to calculate the grade of a student after the input of the student's marks using the following grading system: **[5 marks]**

Percentage ≥ 80 is grade 'A'

Percentage ≥ 70 is grade 'B'

Percentage ≥ 60 is grade 'C'

Percentage ≥ 50 is grade 'D'

Percentage < 50 is grade 'F'

- b) Briefly comment each of the following lines of code: **[5 marks]**

- i. `int x = 2;`
- ii. `int*p;`
- iii. `p = &x;`
- iv. `*p = 4;`
- v. `area = 3.142*radius*radius;`

Question 6:

- a) Using examples, discuss the key components of a function. **[6 marks]**
- b) Develop a program with a function that determines whether a number is prime or not. **[4 marks]**

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