

KANNIYAKUMARI DISTRICT COMMON MONTHLY TEST – AUGUST 2024  
Standard 11  
COMPUTER SCIENCE

48

Time: 1.30 hrs

Maximum marks:50

## Part - I

10x1=10

Answer all the questions. Choose the best answer.

- Omitting details inessential to the task and representing only the essential features of the task is known as?
  - Specification
  - Abstraction
  - Composition
  - Decomposition
- Stating the input property and the input-output relation a problem is known
  - Specification
  - statement
  - algorithm
  - definition
- If  $i=5$  before the assignment  $i:=i-1$  after the assignment, the value of  $i$  is
  - 5
  - 4
  - 3
  - 2
- Suppose  $u,v=10,5$  before the assignment. What are the values of  $u$  and  $v$  after the sequence of assignments?
  - $u,v=5,5$
  - $u,v=5,10$
  - $u,v=10,5$
  - $u,v=10,10$
- A diagrammatic notation for representing algorithm is
  - Pseudo code
  - Flowchart
  - Statement
  - Condition
- A loop invariant need not be true
  - At the start of the loop
  - at the start of each iteration
  - At the end of each iteration
  - at the start of the algorithm
- If  $m \times a + n \times b$  is an invariant for the assignment  $a:=a+8, b:=b+7$  the values of  $m$  and  $n$  are
  - $m=8, n=7$
  - $m=7, n=-8$
  - $m=7, n=8$
  - $m=8, n=-7$
- Which of the following is the not an invariant of the assignment?  $m,n:=m+2, n+3$ 
  - $m \bmod 2$
  - $n \bmod 3$
  - $3 \times m - 2 \times n$
  - $2 \times m - 3 \times n$
- If  $0 < i$  before the assignment  $i:=i+1$  after the assignment we can conduct that
  - $0 < i$
  - $0 \leq i$
  - $i=0$
  - $0 \geq i$
- Named boxes for storing data?
  - value
  - variable
  - function
  - state

## PART-II

Answer any 5 questions. Question number 16 is compulsory.

5x2=10

- Define an Algorithm?
- How do we refine a statement?
- Distinguish between a condition and a statement?
- Define loop invariant?
- What is recursive problem solving?
- Specify a function to find the minimum of 2 numbers?

## PART-III

Answer any 5 questions. Question number 22 is compulsory.

5x3=15

- What is the difference between assignment operator and equality operator?
- What is abstraction?
- What is case analysis?
- Define factorial of a natural number recursively?
- What is the format specification of an algorithm?
- Draw a flowchart for 3 case analysis using alternative statements.

## PART IV

3x5=15

Answer all the questions.

- Write the specification of an algorithm hypotenuse whose inputs are the lengths of the two shorter sides of a right angled triangle and the output is the length of the third side.
- Exchange the contents: Given two glasses marked A and B. Glass A is full of apple drink and glass B is full of grape drink. For exchanging the contents of glasses A and B, represent the state by suitable variables, and write the specification of the algorithm.
- Power can also be defined recursively as

$$a^n = \begin{cases} 1 & \text{if } n = 0 \\ a \times a^{n-1} & \text{if } n \text{ is odd} \\ a^{n-2} \times a^{n-2} & \text{if } n \text{ is even} \end{cases}$$

Construct a recursive algorithm using this definition. How many multiplications are needed to calculate  $a^{10}$ ?