

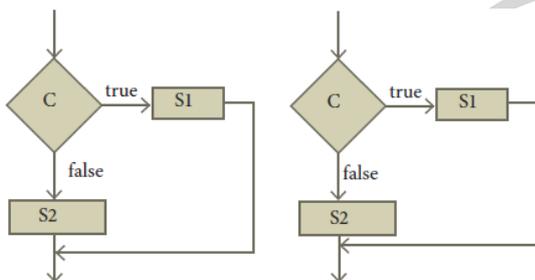
CHAPTER -7- COMPOSITION AND DECOMPOSITION

I. Answer in brief(2 marks)

1. Distinguish between a condition and a statement.
2. Draw a flowchart for conditional statement.
3. Both conditional statement and iterative statement have a condition and a statement. How do they differ?
4. What is the difference between an algorithm and a program?
5. Why is function an abstraction?
6. How do we refine a statement?

II. Answer in a brief(3 marks)

1. For the given two flowcharts write the pseudo code.



2. If C is false in line 2, trace the control flow in this algorithm.

1 S1

2 -- C is false

3 if C

4 S2

5 else

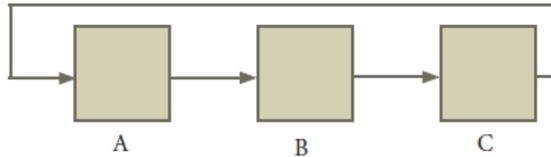
6 S3

7 S4

3. What is case analysis?
4. Draw a flowchart for -3case analysis using alternative statements.
5. Define a function to double a number in two different ways: (1) $n + n$, (2) $2 \times n$

III. Answer in a paragraph(5 marks)

1. 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. Write the specification for exchanging the contents of glasses A and B, and write a sequence of assignments to satisfy the specification.
2. Circulate the contents: Write the specification and construct an algorithm to circulate the contents of the variables A, B and C as shown below: The arrows indicate that B gets the value of A, C gets the value of B and A gets the value of C.



3. Decanting problem. You are given three bottles of capacities 5 ,8, and 3 liters. The 8L bottle is filled with oil, while the other two are empty. Divide the oil in 8L bottle into two equal quantities. Represent the state of the process by appropriate variables. What are the initial and final states of the process? Model the decanting of oil from one bottle to another by assignment. Write a sequence of assignments to achieve the final state.
4. Trace the step-by-step execution of the algorithm for factorial (4).

factorial(n)

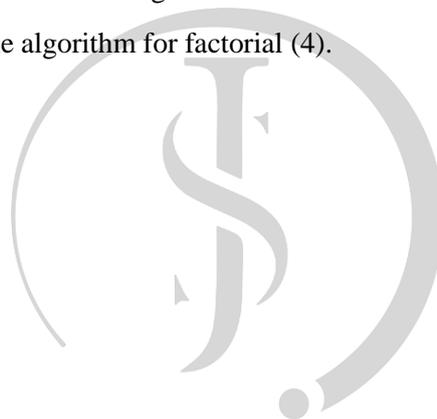
-- inputs : n is an integer , $n \geq 0$

-- outputs : $f = n!$

f, i := 1, 1

while $i \leq n$

f, i := $f \times i$, $i+1$



IV. Additional Questions(2/3 marks)

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1. What are the different notations used mainly for representing algorithm?
2. What are the disadvantages of flowcharts?
3. What is problem decomposition?

V. Additional Questions(5 marks)

1. What is flowchart? What are the different boxes used in flow chart? Give example.