

Cochin University of Science and Technology
Department of Computer Science

M.Sc. (Five Year Integrated) in Computer Science
(Artificial Intelligence & Data Science)

End Semester Examination - March 2022

21-805-0104 : Computational Thinking for Problem Solving

Duration : 3 Hrs

Maximum Marks : 50

Either first or second

Answer all questions. From each question fully attempt either (a) or (b)

1. (a) What is computational thinking (4 marks)
- (b) Explain three coin problem and its solution in connection with computational thinking ? (6 marks)

OR

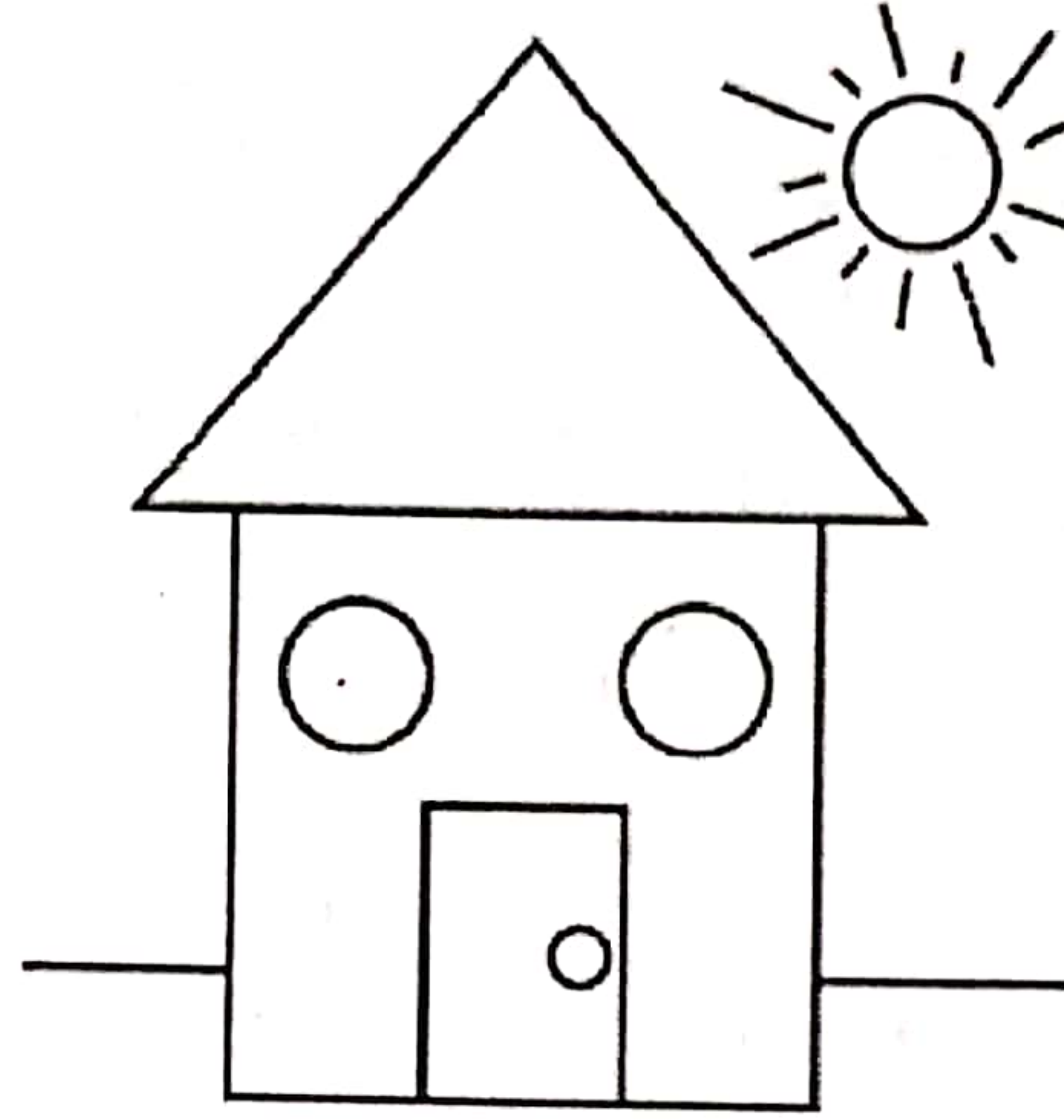
2. (a) State four standard definitions of computational thinking ? (4 marks)
 - (b) What are the major shortcomings of computational thinking ? (6 marks)
3. (a) Explain different logical operators with truth table, venn diagram and proper examples. (4 marks)
 - (b) Write an algorithm and pseudo code for finding the second largest among 3 two digit number ? (Handle proper error cases) (6 marks)

OR

4. (a) Explain tautology and contradiction in propositional logic ? (2 marks)
 - (b) Construct truth table for $[p \vee (q \wedge r)] \leftrightarrow [(p \vee q) \wedge (p \vee r)]$ and check whether it is tautology or contradiction ? (5 marks)
 - (c) Using the principle of mathematical induction prove that $1 + 3 + 5 + \dots$ up to n terms is n^2 ? (3 marks)
5. (a) Explain how important the step of defining a problem ? What are the things one need to take into account while defining the problem ? (5 marks)
 - (b) Explain what are the different complex patterns one can encounter while devising a solution ? (5 marks)

OR

6. (a) Explain the concept of decomposition with the help of any real life situation in detail ? (5 marks)
- (b) Explain the concept of patterns and generalization in general then use it for drawing a house as shown below ? (5 marks)



7. (a) Explain the concept of context and layers in connection with abstraction with suitable examples ? (5 marks)
- (b) What is interaction model ? Draw the activity diagram of an ATM machine with minimum functionalities ? (5 marks)

OR

8. (a) Explain different techniques for debugging ? (5 marks)
- (b) Develop a flowchart to check whether a number is prime or not ? Write 4 test cases in the proper format for the above flowchart (5 marks)
9. (a) What are the names of the five components of usability and what do they measure? (5 marks)
- (b) Develop a python program to print all armstrong numbers between a lower limit and upper limit? (5 marks)

OR

10. (a) Explain how a solution become efficient and elegant ? (4 marks)
- (b) Develop a python program to create a list of integers from a string containing integers separated by a space using list comprehension and remove all duplicates from it? (6 marks)