

Roll. No.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
ANNA UNIVERSITY, CHENNAI - 25.



MID SEMESTER EXAMINATION

B.E. (COMPUTER SCIENCE AND ENGINEERING)

Session: NOV 2022 to MARCH 2023
I Semester - (Regulation R-2018)

CS6102 – COMPUTATIONAL THINKING

Sem / Batch : I / N
Date: 11-JAN-2023

Duration: 90 Minutes
Max. Marks: 40

Answer all Questions


IMP INSTRUCTIONS:











- Write your Name, Roll No., Batch, subject code and subject title, on the answer sheet
- Put date and sign below.
- Write all your answers in the answer sheets supplied, legibly and neatly.

PART – A (5 x 3M = 15 Marks)

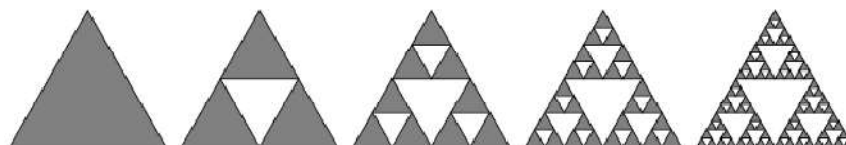
1. In Conway's game of life, some cells of a grid are dead and some are alive. Two cells neighbor each other if they are adjacent horizontally, vertically or diagonally. At the end of each day,

- a dead cell becomes live if it had exactly 3 live neighbors during the day
- a live cell becomes dead unless it had exactly 2 or 3 live neighbors during the day

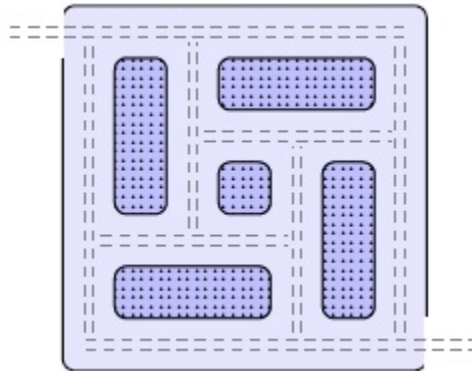
In the following grid, a  indicates a live cell. How many live cells will there be the next day?

2. The *Sierpinski triangle* is a fractal that can be generated as shown. The first five Sierpinski triangles are shown. How many downward pointing (white) triangles are there in the 6th Sierpinski triangle?



3. Every day morning, Mr. Kumar goes for a morning jog in a nearby park. There are several paths through the park, going from top left to bottom right. He always runs the shortest distance, but likes to take alternate routes. How many different routes can Kumar take?



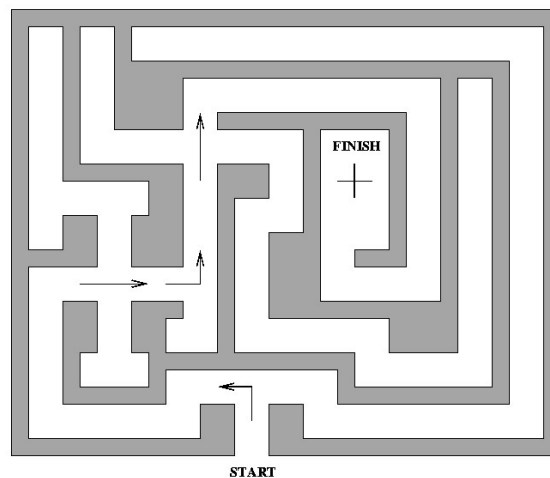
4. Group buildings on the CEG campus by their shared characteristics into a hierarchical tree structure. Consider these buildings: *Red building, DCSE, Science and Humanities, Vivek Audi, Central Library, RCC building* and group them into three different tree structures by:

- a. Architecture and heritage
- b. Purpose and facilities

5. Use the following actions:

- Enter the maze by the gate following the path ahead.
- Turn left following the path ahead.
- Turn right following the path ahead.
- Go straight across the junction following the path ahead.
- Stop at the cross.

The goal is to move from START to FINISH. You must put the actions (given above) in any sequence (not necessarily in the order given) so that if someone followed them they would get to the centre of the maze. You can use each of the above actions as many times as you like in the algorithm and you may not need to use some at all. Your algorithm should be the quickest route.



PART – B (5 x 5 M = 25 Marks)

4. Devise a detailed step-by-step *procedure* and draw a *flowchart* for the following: (5 marks each. Answer any 3 of the 4)

a) Find the length (no. of words) of the longest sentence in a text document.

b) You are an analyst of a supermarket sales and the supermarket has the following schemes:

- If the total purchase in one bill is above Rs. 1000 / - give a discount of 10% and if the purchase is below Rs. 1000 /-, give a discount of 5%.

Compute the count of the no. of users of each of the types.

c) This is a number guessing game (between 10 and 99). Assume any random number between 10 and 99 and at each iteration the guess is identified as *too high* or *too low* or *correct*.

d) Validating email ids entered by users, according to the following conditions in the format (Ex: XXXXXXXXXXXX@gmail.com).

i) a min and a max of 3 and 10 characters before the @ symbol are allowed

ii) the characters before the @ symbol shall not repeat more than twice and shall only contain a combination of alphabets and numerals but the first symbol shall not be a numeral.

5. Codeoku are exactly like Sudoku except they use symbols instead of numbers. You must place the 9 symbols in the grid so that every row and every column contains all the symbols. Also every marked 3x3 square should contain one of each symbol. Complete the grid using only the following symbols found in computer programs: [; } > % \$ & # @

%	}	@	\$	&				
;	>	&		}	[\$		#
\$		[%	@	&	
#		%		;	>	}	\$	
	&	\$	%				@	[
			&				>	%
		#	}	[%	;	>
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	;	}	>	%	\$	&	#	@

6. Use the *Marks dataset* supplied and answer the following questions (use MS Excel / equivalent for analysis):

a) Who fared better Boys / Girls?

b) Count the number of students who scored more than 70 in atleast 2 of the three subjects.
