***CCCS 104 - Data Structures and Algorithms***

LEARNING TASK (SEARCHING)

GROUP NO: \_\_\_\_\_\_\_\_\_\_ SECTION: \_\_\_\_\_\_\_\_\_\_

GROUP LEADER: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

GROUP MEMBERS: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**RATIONALE**

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| *Explain briefly what is Searching and how it works? What are the common examples? Its applications?*  *Introduce your develop Python program, what can it do?* |

**SEARCH PROBLEMS and SOLUTIONS**

**PROBLEM 1: LINEAR SEARCH (Policemen and thieves)**

**PROGRAM CODE**

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| --- |
| *Insert your Python code here, be sure to add comments to describe each line/set of codes…* |

**TEST CASES**

|  |  |
| --- | --- |
| **INPUT** | **OUTPUT** |
| 5  3 1  P T P  T P T  T T P  N K  ?  N K  ?  N K  ?  N K  ? | 3  ?  ?  ?  ? |
| **Explanation (Test Case 1)** | |
| Total Thieves = 5  Number of thieves reachable by policemen in Row 1 = 1  Number of thieves reachable by policemen in Row 2 = 2  Number of thieves reachable by policemen in Row 3 = 1  However, one policeman can catch at most 1 thief. Hence, in Row 2, only 1 thief is catchable.  Therefore, the 3 thieves can be caught. | |
| **Explanation (Test Case 2)** | |
| Insert your explanation for test case 2 | |
| **Explanation (Test Case 3)** | |
| Insert your explanation for test case 3 | |
| **Explanation (Test Case 4)** | |
| Insert your explanation for test case 4 | |
| **Explanation (Test Case 5)** | |
| Insert your explanation for test case 5 | |

**PROBLEM 2: BINARY SEARCH (Road to playoffs)**

**PROGRAM CODE**

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| *Insert your Python code here, be sure to add comments to describe each line/set of codes…* |

**TEST CASES**

|  |  |
| --- | --- |
| **INPUT** | **OUTPUT** |
| 5  4 2 2 1  4 1 2 3  4 1 1 1  4 4 4 4  N M K B  ?  N M K B  ?  N M K B  ? | 3  4  ?  ?  ? |
| **Explanation (Test Case 1)** | |
| Only one team can make it to the playoffs, two days of league stage are left and 2 points on each day are to be gained. Every team has the probability to qualify for playoffs other than a team with 1 point. Let us look at the scenarios:  Bold are those teams which we want to win:  Team with 4 points: [**4**,**1**,2,3] -> [**5**,**2**,2,3] -> [5,3,2,3]  Team with 1 point has no chance to qualify ( Zero probability)  Team with 2 points: [4,**1**,**2**,3] -> [4,**2**,**3**,3] -> [4,3,4,3]  (Any of the first or third team can qualify so probability>0)  Team with 3 points: [4,**1**,2,**3**] -> [4,**2**,2,**4**] -> [4,3,2,5] 4th team has maximum points so they can be chosen in this case.  So, all teams other than the second have a non-zero chance, and also note that in case of ties you can qualify any team you want. | |
| **Explanation (Test Case 2)** | |
| Insert your explanation for test case 2 | |
| **Explanation (Test Case 3)** | |
| Insert your explanation for test case 3 | |
| **Explanation (Test Case 4)** | |
| Insert your explanation for test case 4 | |
| **Explanation (Test Case 5)** | |
| Insert your explanation for test case 5 | |

**TUTORIAL VIDEO**

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| YouTube Link/s: |

**TAKEAWAYS**

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| Name of Member: |
| Contribution to the Group: |
| Learnings: |

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| Name of Member: |
| Contribution to the Group: |
| Learnings: |

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| Name of Member: |
| Contribution to the Group: |
| Learnings: |