



**NED University of Engineering & Technology**

**DEPARTMENT OF COMPUTER SCIENCE& INFORMATION TECHNOLOGY**

**SECTION: B**

**Batch:2022-2026**

**DATA STRUCTURE ALGORITHMS & APPLICATIONS (CT-157)**

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**PROJECT NAME: SNAKES AND LADDER GAME**

**GROUP MEMBERS:**

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## **Key Concepts from DSAA:**

The Project Utilizes the concepts of Stack to manage the positions of Player 1 and Player 2 on the game board.

This helps in updating Players positions and printing them on the board. It also helps in undo feature of the game, where last position is popped and player rolls again.

## **Specifications**

Specific DSAA and specific Board game mechanics were implemented within our game in order to make it stand out a bit in functionality Some of the notable points of our project are as follows:

## **Modular approach**

The Snake and Ladder game code exemplifies a modular approach through the systematic organization of functionalities into separate functions. These functions encapsulate specific aspects of the game, contributing to enhanced readability, maintainability, and reusability of the code.

## **Data Structures**

Use to manage and track Players positions as well as be able to implement Undo feature in the game.

## **Algorithmic Approach**

Creation of an optimized algorithm for handling specific conditions and scenarios that occur in a Snake and Ladder game. Optimization of algorithms such that unnecessary calculations are kept at minimum as allowed by our skill.

## PROS AND CONS:

PROS	CONS
<ul style="list-style-type: none"><li>➤ <b>Accessibility:</b> Digital versions of board games make them accessible to a wider audience, as players can enjoy the game without the need for physical components.</li><li>➤ <b>Randomization:</b> Implementing randomization algorithms for dice rolls ensures fair gameplay, avoiding the possibility of biased outcomes that may occur with physical dice.</li><li>➤ <b>Automated Rule Enforcement:</b> The digital platform can automatically enforce game rules, reducing the likelihood of rule misunderstandings or disputes among players.</li></ul>	<ul style="list-style-type: none"><li>➤ <b>Dependency on Technology:</b> Digital games rely on technology, and technical issues such as bugs, glitches, or compatibility problems can hinder the gaming experience.</li><li>➤ <b>Learning Curve:</b> Players who are accustomed to traditional board games may experience a learning curve when transitioning to digital versions due to differences in user interface and controls.</li></ul>

# **Experience:**

## ➤ **Understanding Rules:**

Begin by understanding the rules of the Snake and Ladder game. Identify key components such as the board structure, dice rolling mechanism, and the effects of landing on squares with snakes and ladders.

## ➤ **Dice Rolling Mechanism:**

Implement a C++ random number generator for life like dice rolls.

## ➤ **Handling Snakes and Ladders:**

Design a mechanism for square effects, and to display Snakes, ladders and numbers on the board.

## ➤ **Player Movement:**

Code logic for player movement based on dice rolls, adhering to game rules.

## ➤ **Turn-Based System:**

Develop a turn-based system for player dice rolls and movements.

## ➤ **Winning Condition:**

Implement the winning condition for player victory.

## **Difficulties:**

➤ **Algorithm Complexity:**

Address complexity arising from snakes and ladders' effects.

➤ **Data Structure Choice:**

Tackle challenges in selecting a suitable data structure, especially for advanced features.

➤ **Random Number Generation:**

Overcome challenges in generating unbiased random numbers for accurate dice simulation.

➤ **Handling User Input:**

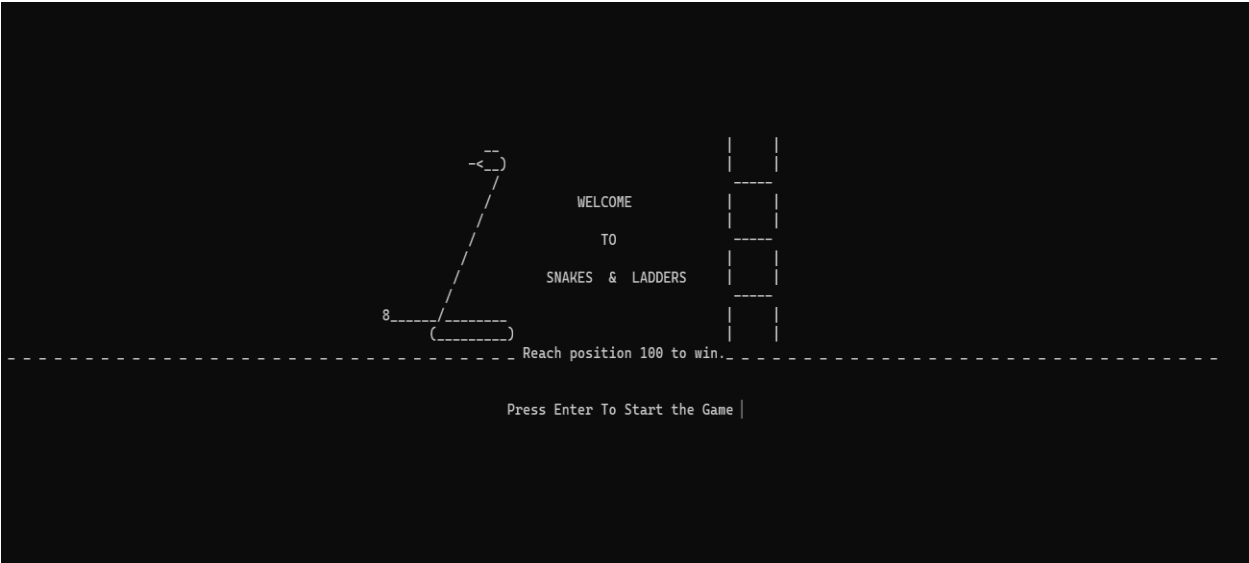
Address complexities in user input handling, especially with a graphical interface.

➤ **Debugging:**

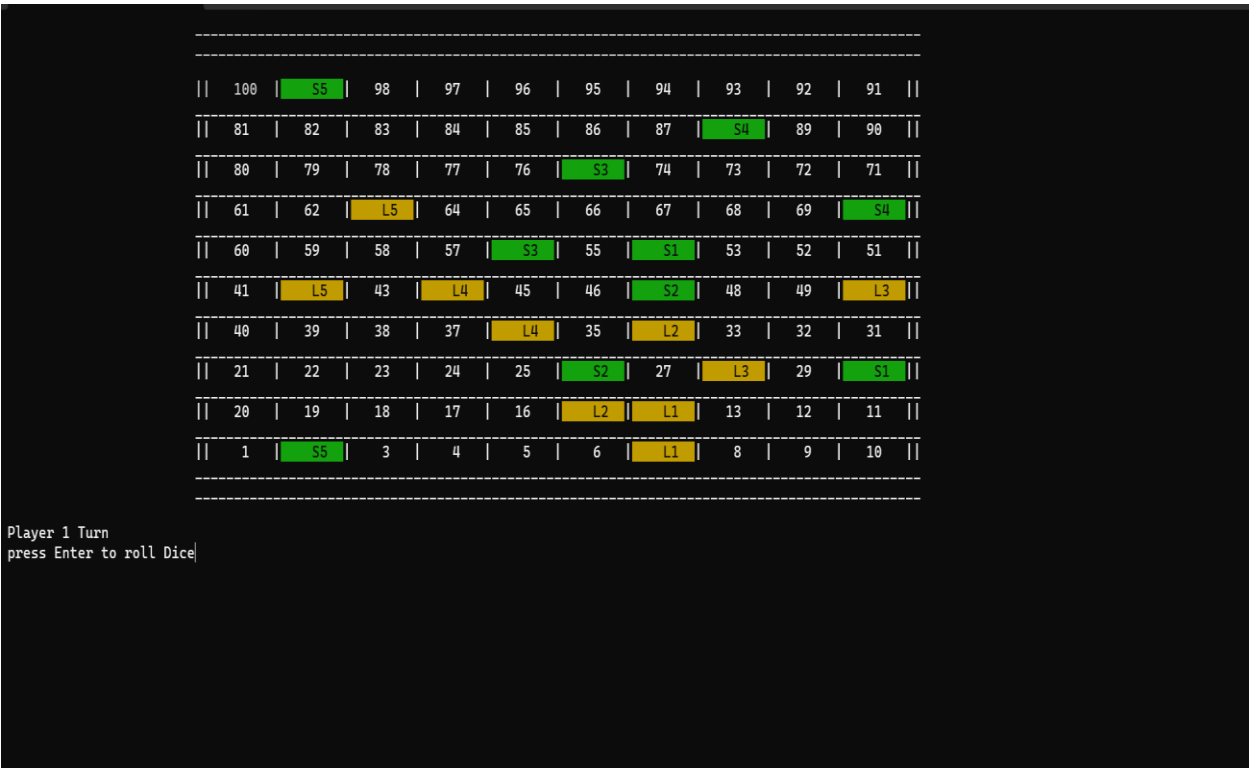
Navigate challenges in debugging complex logic and interactions.

# OUTPUT

## HOMESCREEN:



## Initial Board:



PLAYERS AT DIIFERENT POSITIONS:

You rolled a 2.  
Player 1 rolled a 2.  
Player 1 is now at position 28.  
Hooray! Player 1 climbed a ladder. Move forward to position 50.

100	S5	98	97	96	95	94	93	92	91
81	82	83	84	85	86	87	S4	89	90
80	79	78	77	76	S3	74	73	72	71
61	62	L5	64	65	66	67	68	69	S4
60	59	58	57	S3	55	S1	53	52	51
41	L5	43	L4	45	46	S2	48	49	P1
40	39	38	37	L4	35	L2	33	32	31
21	22	23	24	25	P2	27	L3	29	S1
20	19	18	17	16	L2	L1	13	12	11
1	S5	3	4	5	6	L1	8	9	10

You want to Undo Move? Press Y |

PLAYERS AT SAME POSITIONS:

You rolled a 4.  
Player 2 rolled a 4.  
Player 2 is now at position 18.

100	S5	98	97	96	95	94	93	92	91
81	82	83	84	85	86	87	S4	89	90
80	79	78	77	76	S3	74	73	72	71
61	62	L5	64	65	66	67	68	69	S4
60	59	58	57	S3	55	S1	53	52	51
41	L5	43	L4	45	46	S2	48	49	L3
40	39	38	37	L4	35	L2	33	32	31
21	22	23	24	25	S2	27	L3	29	S1
20	19	P1/P2	17	16	L2	L1	13	12	11
1	S5	3	4	5	6	L1	8	9	10

You want to Undo Move? press Y  
Player 1 Turn  
press Enter to roll Dice



PLAYER WON:

```
You rolled a 5.  
Player 1 rolled a 5.  
Player 1 is now at position 100.
```

P1	S5	98	97	96	95	94	93	92	91
81	82	83	84	P2	86	87	S4	89	90
80	79	78	77	76	S3	74	73	72	71
61	62	L5	64	65	66	67	68	69	S4
60	59	58	57	S3	55	S1	53	52	51
41	L5	43	L4	45	46	S2	48	49	L3
40	39	38	37	L4	35	L2	33	32	31
21	22	23	24	25	S2	27	L3	29	S1
20	19	18	17	16	L2	L1	13	12	11
1	S5	3	4	5	6	L1	8	9	10

```
Player 1 reached position 100 and won the game
You want to Restart? press Y |
```

END SCREEN:



## **CONCLUSION:**

The Snake and Ladder game project represents a successful application of programming concepts, including Data Structures and object-oriented principles. The code is organized in a modular fashion, enhancing readability and maintainability. Additional features such as snakes, ladders, and undo functionality contribute to the complexity and engagement of the game. The graphical representation of the game board adds a visual dimension to the user interface, enhancing the overall gaming experience making the game accessible and enjoyable for users.