

Bringing Abstract Programming Concepts to Life: Visualizing a Theater **Seating System with AI Tools**



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The Challenge

- . Programming is based on invisible, abstract concepts.
- Students often struggle to grasp these ideas— • especially abstract classes and methods.

The Solution

. AI tools bridge the gap by visualizing abstract ideas in concrete, intuitive ways.



Java Theater Seat Booking System

Project Summary	Key Feat
Students create a theater	Users pure
booking system using Java	selecting a
2D arrays.	Each seat
(9 rows x 10 columns)	price, base

Learning Objectives

Apply 2D arrays, user input, and control flow in a real-world scenario.

ures

chase tickets by a seat or price has a different ed on the location

Java Theater Ticket Master Visualization



Here is the seating chart in Java or C++ : **2-Dimensioal Array**

int[][] seats =

{ 30,40,50,50,50,50,50,50,40,30 }, { 20,30,30,40,50,50,40,30,30,20 }, { 20,20,30,30,40,40,30,30,20,20 }, { 10,10,20,20,20,20,20,10,10 }, { 10,10,20,20,20,20,20,20,10,10 }, { 10,10,20,20,20,20,20,10,10 }, { 10,10,10,10,10,10,10,10,10,10 }, { 10,10,10,10,10,10,10,10,10,10 }, { 10,10,10,10,10,10,10,10,10,10 }, };

Set Seat Price Visualization with AI (Deep Seek)

Step-by-Step Process

- **1. Define 2D array** with price values.
- 2. Use AI tools (e.g., Deep Seek) to generate a visual seating chart.
- **3.** Map seat prices from \$10 to \$50.
- **4.** Link code to reality—students "see" the logic behind arrays.

Example Output: Deep Seek quickly renders this into a text-based price chart

JAVA THEATER BY PRIC GE FRONT | \$30 \$40 \$50 \$50 \$50 \$50 \$50 \$50 \$40 \$ 1: \$20 \$30 \$30 \$40 \$50 \$50 \$40 \$30 \$30 \$ 2: \$20 \$20 \$30 \$30 \$40 \$40 \$30 \$30 \$20 \$ 3: \$10 \$10 \$20 \$20 \$20 \$20 \$20 \$20 \$10 \$ 4: \$10 \$10 \$20 \$20 \$20 \$20 \$20 \$20 \$10 \$ 5: \$10 \$10 \$20 \$20 \$20 \$20 \$20 \$20 \$10 \$ 6: \$10 \$10 \$10 \$10 \$10 \$10 \$10 \$10 \$ 7: \$10 \$10 \$10 \$10 \$10 \$10 \$10 \$10 \$ 8: 9: \$10 \$10 \$10 \$10 \$10 \$10 \$10 \$10 \$10 \$

Ŷ	Generate visual representation Use AI tools to create a graphical seating chart			
e	Ð	Enhance understanding Bridge the gap between code and real-wo	orld layout	
	Ŕ		Deepen learning Help students connect abstract arrays to concrete applications	

Seat Position Mapping by AI with Deep Seek

Learning Purpose

- . Understand zero-based indexing.
- . Visualize how array positions map to real-world locations.

Steps

- 1. Create 2D array of seat prices.
- 2. Label each seat as [row, column].
- 3. Generate a **coordinate chart** using AI (e.g., Deep Seek).
- 4. Help students navigate arrays logically.



Example Position Output by Deep Seek – Shows exact mapping from code to physical seat location.

JAVA THEATER SEATING POSITIONS

STAGE FRONT

	Col	0	Со	ol 1	Col	2	Col 3	Col 4	Col 5	Col 6	Col 7	7 Col 8	Col 9
Row	0:	[0,	0]	[0,1	.] [(D,2]	[0,3] [0,4]	[0,5]	[0,6]	[0,7	'] [0 <i>,</i> 8]	[0 <i>,</i> 9]
Row	1:	[1,	0]	[1,1	.] [:	1,2]	[1,3] [1,4]	[1,5]	[1,6]	[1,7	'] [1 <i>,</i> 8]	[1,9]
Row	2:	[2,	0]	[2,1	.] [2	2,2]	[2,3] [2,4]	[2,5]	[2,6]	[2,7	'] [2,8]	[2,9]
Row	3:	[3,	0]	[3,1	.] [3	3,2]	[3,3] [3,4]	[3,5]	[3,6]	[3,7	'] [3 <i>,</i> 8]	[3 <i>,</i> 9]
Row	4:	[4,	0]	[4,1	.] [4	4,2]	[4,3] [4,4]	[4,5]	[4,6]	[4,7	'] [4,8]	[4,9]
Row	<i>י</i> 5:	[5,	0]	[5,1	.] [!	5,2]	[5,3] [5,4]	[5,5]	[5,6]	[5,7	'] [5 <i>,</i> 8]	[5 <i>,</i> 9]
Row	6:	[6,	0]	[6,1	.] [6	5,2]	[6,3] [6,4]	[6,5]	[6,6]	[6,7	'] [6 <i>,</i> 8]	[6 <i>,</i> 9]
Row	7:	[7,	0]	[7,1	.] [7	7,2]	[7,3] [7,4]	[7,5]	[7,6]	[7,7	'] [7 <i>,</i> 8]	[7 <i>,</i> 9]
Row	8:	[8,	0]	[8,1	.] [8	8,2]	[8,3] [8,4]	[8,5]	[8,6]	[8,7	'] [8,8]	[8,9]

Enhancing Visualization with Canva AI

JAVA THEATE

	Describe the image in your mind, and I'll bring it to life		
	+		
	(S Create an image x) Style - Aspect Ratio -		
	Canva AI can make mistakes. Please check for accuracy. See terms • Giv	er fredback	
Variational			2.00.110-0
Your images			a rai obŝ
Just now			

Why Canva AI?

- 30-day free trial, extendable. •
- . Easily create **professional** visuals.

Applications

- . Match Java seating layout visually.
- . Use **ChatGPT** to add avatars or simulate seat bookings.



ChatGPT Enhancements (paid plan)

With the \$20/month subscription:

- Add **seat numbers** to theater image.
- Place avatars on purchased seats.
- visual layout. Validate logic and enhance • engagement.

Compare **program output** with a

Other Useful AI tools:

Tool	Function
Mermaid AI	Create flowcharts, pseudocode
Ninja AI	Debug student code
Gamma AI	Auto-generate presentation slides





Final Thoughts

For Instructors

Using AI is like having a digital assistant—always ready to make concepts come alive.

For Students

AI empowers creativity, enhances logic, and builds confidence through interactive learning.