CSCI 3901

Software Development Concepts



Faculty of Computer Science

Problem 1: "Write test cases for Alice's Sudoku class"

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Table Category Description

Test ID

• Serial number for each test case

Test Scenario

What is been tested

Test Case

• Type of parameter i.e. valid or invalid is passed to the case

Pre-Condition

Conditions on which the passed parameters will be validated

Test Steps (Ascending)

- Order in which Module will be tested.
- In other words, order in methods will be executed

User Input

• Passed value to the parameters

Actual Result

Result of the test case based on the user input

Additional Comments

- Describes why did the test case failed or succeeded.
- And which preconditions were validated.

Status

- PASS it indicates that the test case has behaved in the expected manner and yields desirable result.
- FAIL it indicates that the passed parameter of test case has violated the preconditions or any other error occurred.

Sodoku (int size)

Test ID	Test Scenario	Test Case	Pre Condition	Test Steps (Method)	User Input	Actual Result	Additional Comments	Status
TC_01	Verify size parameter	Enter valid size	Need integer value in range (1 & n²)	Sudoku (size)	size= 3	Returns True	Size can be any positive value	PASS
TC_03	Verify size parameter	Enter valid size	Need integer value in range (1 & n ²)	Sudoku (size)	size= -34	Returns False	Size can't be negative value	FAIL
TC_04	Verify size parameter	Enter valid size	Need integer value in range (1 & n²)	Sudoku (size)	size= null	Returns False	Size can't be NULL	FAIL
TC_05	Verify size parameter	Enter valid size	Need integer value in range (1 & n²)	Sudoku (size)	size= 0	Returns False	Size cannot take zero as value as grid 0 x	FAIL
TC_06	Verify size parameter	Enter valid size	Need integer value in range (1 & n²)	Sudoku (size)	size = 2147483647	Returns True	Boundary Case	PASS
TC_07	Verify size parameter	Enter valid size	Need integer value in range (1 & n²)	Sudoku (size)	size= "13"	Returns False	Size can't be a string value even if it's an integer	FAIL

- 1. Sodoku (int size)
- 2. SetPossibleValues(values)

Test ID	Test Scenario	Test Case	Pre-Condition	Test Steps (Method)	User Input	Actual Result	Additional Comments	Status
	1. n ² x n ² grid is generated by	Enter valid	No. of character should be size ² and	Sudoku(size)	size= 3	Returns	Size can be any positive value	
TC_01		number of character values	each unique character should be of String type	setPossibleValues (Values)	values=" a b c d e f g s w "	True	parameter has size ² unique characters	PASS
			No. of character					
	1. n ² x n ² grid is generated by	Enter valid	should be size² and	Sudoku(size)	size= 3	_	Size can be any positive value	
TC_02	Sudoku(n) 2. generated value String of size (n²)	number of integer values	each unique character should be of String type	setPossibleValues (Values)	values=" 3 2 6 1 7 4 5 8 9 "	Returns True	•	PASS
	1. n ² x n ² grid is generated by	Enter valid number of	No. of character should be size ² and each unique	Sudoku(size)	size= 3	Returns	Size can be any positive value	
TC_03	Sudoku(n) 2. generated value String of size (n²)	integer + String values	character should be of String type	setPossibleValues (Values)	values=" e w 6 a 7 x 5 y 9 "	True	parameter has size ² unique integer and string characters	PASS
	1. n ² x n ² grid is generated by	I Enter Valid	No. of character should be size² and	Sudoku(size)	size= 3		Size can be any positive value	PASS
TC_03	Sudoku(n) 2. generated value String of size (n²)	number of integer + String values	each unique character should be of String type	setPossibleValues (Values)	values=" e w 6 a 7 x 5 y 9 "	Returns True	parameter has size ² unique integer and string characters	
			No of character					
	 n² x n² grid is generated by Sudoku(n) generated value String of size (n²) 	ed by Enter invalid number of ated value String values	No. of character should be size ² and each unique	Sudoku(size)	size= 3	Returns	Size can be any positive value	FAIL
TC_04			character should be of String type	setPossibleValues (Values)	values=" e 6 a 7 x y 9 "	False	number of unique characters is less than size ²	

	1. n ² x n ² grid is generated by	Enter invalid	No. of character should be size ² and	Sudoku(size)	size= 3		Size can be any positive value	FAIL
TC_05	Sudoku(n) 2. generated value String of size (n²)	number of String values	each unique character should be of String type	setPossibleValues (Values)	values=" e w 6 8 a 7 x t 5 y 9 "	Returns False	number of unique characters is more than size ²	
	1. n ² x n ² grid is generated by	Enter invalid	No. of character should be size ² and	Sudoku(size)	size= 3		Size can be any positive value	
TC 06	Sudoku(n)	number of	each unique			Returns False	positive value	FAIL
	<u> </u>	String values	character should be of String type	setPossibleValues (Values)	values=" "		value parameter can't be null or empty string	
	1. n ² x n ² grid is generated by		No. of character should be size ² and	Sudoku(size)	size= 3		Size can be any positive value	
TC 07	,		character should setPossible				positive value	FAIL
TC_0/	Sudoku(n) 2. generated value String of size (n²)			setPossibleValues (Values)	values=" "	False	value parameter can't be null or empty string	FAIL
	1. n ² x n ² grid is generated by	nerated by doku(n) generated value Enter duplicate String values	No. of character should be size² and	Sudoku(size)	size= 3		Size can be any positive value	
TC_07	Sudoku(n) 2. generated value String of size (n²)		each unique character should be of String type	setPossibleValues (Values)	values=" w w 6 a a x t b b g "	Returns False	No character must be repeated more than once.	FAIL

- Sodoku (int size)
 SetPossibleValues(values)
- SetCellValue(x,y,letter)

Test	Test Scenario	Test Case	Pre-Condition	Test Steps	User	Actual	Additional	Status	
ID	lest scenario	Test Case	rie-condition	(Method)	Input	Result	Comments		
	1. n² x n² grid is generated	valid size	integer size in range (1 to n²)	Sodoku (size)	size=3	Returns True			
TC_001	by Sudoku(n)	valid x value	integer x in range (1 to size²)	SetPossibleValues(values)	value ={1 to 9}	Returns True	no .of values are (size 2)	PASS	
10_001	2. generated value set of	valid y value	integer y in range (1 to size²)	SetCellValue(x,y,letter)	x=3 y=4	Returns True	value of x,y are in range (1, size 2)] PASS	
	size (n²)	valid letter value	letter should be in value set	SetCellvalue(x,y,letter)	letter=5	Returns rrue	letter value is from value set		
	3. set value of an empty cell								
	1. n ² x n ² grid is generated	valid size	integer size in range (1 to n²)	Sodoku (size)	size=4	Returns True			
TC_002	by Sudoku(n)	invalid x value	integer x in range (1 to size²)	SetPossibleValues(values)	value ={1 to 16}	Returns True	Value of x is out	FAIL	
10_002	2. generated value set of	valid y value	integer y in range (1 to size²)	SetCellValue(x,y,letter)	x=19 y=14	Returns False	of range (1, size 2)		
	size (n²)	valid letter value	letter should be in value set		letter=9	110101111111111111111111111111111111111			
	3. set value of an empty cell						1		
	1. n ² x n ² grid is generated	valid size	integer size in range (1 to n²)	Sodoku (size)	size=4	Returns True			
TC_003	by Sudoku(n)	valid x value	integer x in range (1 to size²)	SetPossibleValues(values)	value={A to P}	Returns True	Value of y is out	FAIL	
10_003	2. generated value set of	invalid y value	integer y in range (1 to size²)	SetCellValue(x,y,letter)	x=4 y=23	Returns False	of range (1, size 2)		
	size (n²)	valid letter value	letter should be in value set	Settle in Value (x, y, i etter)	letter=K	Trecurris raise			
	3. set value of an empty cell								
	1. n ² x n ² grid is generated	valid size	integer size in range (1 to n²)	Sodoku (size)	size=6	Returns True	letter is out		
TC_004	by Sudoku(n)	valid x value	integer x in range (1 to size²)	SetPossibleValues(values)	value ={1 to 36}	Returns True	of value set	FAIL	
	2. generated value set of	valid y value	integer y in range (1 to size²)	SetCellValue(x,y,letter)	x=4 y=23	Returns False	range (1 , 36)		
	size (n²)	invalid letter value	letter should be in value set		letter=37	110101111111111111111111111111111111111	Tange (1, 30)		
	3. set value of an empty cell								
	1. n ² x n ² grid is generated	valid size	integer size in range (1 to n²)	Sodoku (size)	size=3	Returns True			
TC_005	by Sudoku(n)	invalid x value	integer x in range (1 to size²)	SetPossibleValues(values)	value ={1 to 9}	Returns True	Value of x & y is out	FAIL	
	2. generated value set of	invalid y value	integer y in range (1 to size²)	SetCellValue(x,y,letter)	x=14 y=12	Returns False	of range (1, size 2)		
	size (n²)	valid letter value	letter should be in value set	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	letter=6				
	3. set value of an empty cell						1		
	1. n ² x n ² grid is generated	valid size	integer size in range (1 to n²)	Sodoku (size)	size=3	Returns True			
TC_006	by Sudoku(n)	null x value	integer x in range (1 to size²)	SetPossibleValues(values)	value={1 to 9}	Returns True	x & y can't	FAIL	
	2. generated value set of	null y value	integer y in range (1 to size²)	SetCellValue(x,y,letter)	x=NULL y=NULL	Returns False	accept NULL values		
	size (n²)	valid letter value	letter should be in value set		letter=6				
	3. set value of an empty cell								
	1 n² v n² grid is garageted	11.1	14 2	Codel ()	-:- 2	Data T			
	1. n ² x n ² grid is generated	valid size	integer size in range (1 to n²)	Sodoku (size)	size=3	Returns True	lottor coult		
TC_007	by Sudoku(n)	valid x value	integer x in range (1 to size ²)	SetPossibleValues(values)	value ={1 to 9}	Returns True	letter can't	FAIL	
	2. generated value set of	valid y value	integer y in range (1 to size²)	SatCallValua(v v lattar)	x=2 y=1	Raturne Falca	accept NULL values		

	size (n²)	null letter value	letter should be in value set	Jetcenvalue(x,y,letter)	letter=NULL	Neturns raise		
	3. set value of an empty cell							
	1. n ² x n ² grid is generated	valid size	integer size in range (1 to n²)	Sodoku (size)	size=3	Returns True	x & y ara passed correct values but not	
TC_008	by Sudoku(n) x =String value		integer x in range (1 to size ²)	SetPossibleValues(values)	value ={1 to 9}	Returns True	as integer but string which is not	FAIL
10_008	2. generated value set of	y=String value	integer y in range (1 to size²)	SetCellValue(x,y,letter)	x="2" y="1"	Returns False	allowed	PAIL
	size (n²)	valid letter value	letter should be in value set	SetCellValue(x,y,lettel)	letter=7			
	3. set value of an empty cell							
	1. n ² x n ² grid is generated	valid size	integer size in range (1 to n²)	Sodoku (size)	size=4	Returns True	this is a boundary case where x, y and	
TC 009	by Sudoku(n)	invalid x value	integer x in range (1 to size ²)	SetPossibleValues(values)	value={A to P}	Returns True	1	FAIL
10_009	2. generated value set of	invalid y value	integer y in range (1 to size²)	SetCellValue(x,y,letter)	x=34 y=20	Returns False	letter are not within their respective	FAIL
	size (n²)	invalid letter value	letter should be in value set	Jetcenvalue(x,y,letter)	letter=Z	Neturns Faise	ranges	
	3. set value of an empty cell					_		

- 1. Sodoku (int size)
- 2. SetPossibleValues(values)
- SetCellValue(x,y,letter)
- 4. Solve()

Test	Test	Test	Pre	Test Steps	User	Actual	Additional	Status
ID	Scenario	Case	Condition	(Method)	Input	Result	Comments	Status
	1. n² x n² grid is made by Sudoku(n) 2. generated value set of size (n²) 3. set value of empty cell 4. Call Solve() to solve sudoku	valid size valid values String	integer size in range (1 to n²) No. of unique character = size²	Sudoku (size) SetPossibleValues (values)	size=3 value= {a to i}	Return True Return True	Size can be any positive value no .of values are (size 2)	
TC_01		valid x,y value	integer x,y in range (1 to size²)	SetCellValue (x,y,letter)	x=3 y=4 letter= f	Return True	x,y, letter are validated	PASS
		valid letter value	letter should be in value set	Solve()	No i/p	Return True	sudoku will be solved	
	1. n ² x n ² grid is	valid size	integer size in range (1 to n²)	Sudoku (size)	size=3	Return True	Size can be any positive value	
	made by Sudoku(n) 2. generated value set of size (n²) 3. set value of empty cell	valid values String	No. of unique character = size ²	SetPossibleValues (values)	value= {a to i}	Return True	no .of values are (size ²)	
TC_02		valid x,y value	integer x,y in range (1 to size²)	SetCellValue (x,y,letter)	x=3 y=4	Return	x,y, letter are validated	FAIL
	4. Call Solve() to solve sudoku	valid letter value	letter should be in value set	Solve()	letter= f No i/p	True Return False	sudoku will not be solved as no possible solution found	

NOTE:

- Here, TC_02 is only one of the best case where every method was executed successfully but Solve() method return False as no possible solutions was found.
 - 2. It's worth noting that there will be cases where Solve() will return False when one of the previous executable method (Sudoku(size), SetPossibleValues(values),SetCellValue(x,y,letter)) also return False.

- 1. Sodoku (int size)
- 2. SetPossibleValues(values)
- SetCellValue(x,y,letter)
- 4. Solve()

Test	Test	Test	Pre	Test Steps	User	Actual	Additional	CI I
ID	Scenario	Case	Condition	(Method)	Input	Result	Comments	Status
	 n² x n² grid is made by Sudoku(n) generated value 	valid size valid	integer size in range (1 to n²) No. of unique	Sudoku (size) SetPossibleValues	size=3 value=	Return True Return	Size can be any positive value no .of values	
TC_01	set of size (n²) 3. set value of empty cell	values String valid	character = size ² integer x,y in	(values) SetCellValue	{a to i} x=3,y=4	True Return	are (size ²) x,y, letter are	PASS
	4. Call Solve() to solve sudoku	x,y value valid letter value	range (1 to size²) letter should be in value set	(x,y,letter) Solve()	letter= f No i/p	True Return True	validated sudoku will be solved	
	5. Call toPrintString()	valid emptyCellLetter	emptyCellLetter is of char data type	toPrintString()	X' or 'O'	Return True	Return multi line Strings	
	1. n² x n² grid is made by Sudoku(n) 2.Call toPrintString() 3. set value of empty cell 4. Call Solve() to solve sudoku	valid size	integer size in range (1 to n²)	Sudoku (size)	size=3	Return True	Size can be any positive value	
		valid emptyCellLetter	emptyCellLetter is of char data type	toPrintString()	X' or 'O'	Return False	This method retun false its called	
TC_02							before executing setpossiblevalues()	FAIL
							SetCellValue(), Solve()	
TC_03	2.Call toPrintString() 3. set value of empty cell 4. Call Solve() to solve sudoku	valid emptyCellLetter	emptyCellLetter is of char data type	toPrintString()	X' or 'O'	Return False	This method retun false its called before executing Sudoku()	FAIL
		valid size	integer size in range (1 to n²)	Sodoku (size)	size=3	Return False	Size can be any positive value	

NOTE:

- 1. Here, another case of TC_01 is that Solve() method returns False and still it will run toPrintString() and print the Sudoku.
- 2. Similar to TC_02, its possible that toPrintString() will be called after successfully executing SetPossiblevalues, also after SetCellValues() and still it will return False as the correct order of calling this method is (Sudoku -> SetPossibleValues->SetCellValues -> Solve -> toPrintString)