Assignment 1 Part 2 + bonus question

Section I: Use cases

Play Yahtzee game

Participating actors: one to five players

This is a high-level use case, it includes Play new game use case

Entry condition: there must be exactly five dice available with six possible faces (1,2,3,4,5,6) and each player expected to have individual score sheet with rows containing 13 available scoring categories for each of 6 games in columns.

Play new game

Participation actors: one to five players

This is a high-level use case, it includes Take turn , End game use cases. Players take turns playing game.

Entry condition: not all of 6 games had been played; at least one game column with scoring categories on each individual score sheet must be available

Exit condition: each player took no more than 13 turns

Take turn

Participating actors: a player

This is a high-level use case, it includes Roll dice , Hold dice , Score in a category use cases.

Extended exception use case:

1. The system does not allow to take a turn, that is to roll dice, if the player has already scored in all of the categories for a current game on her individual score sheet

Entry condition: at least one scoring category for the current game must be available on player's score sheet. Available category is the one that has not been scored yet.

Exit condition: the player must have rolled dice 1 to 3 times, and score in exactly one of the available categories on her individual score sheet

Roll dice

Participating actors: a player

This is a low-level use case. The player rolls 1 to 5 dice that are not being held

Extended exception use case:

1. The system does not allow to roll dice that is being held
2. The system does not allow to roll dice if all 3 rolls has already been made for the current turn

Entry condition: the player is given a turn in a game and and yet has not made all 3 rolls in the current turn. 0 to 4 dice may be held before the roll starts.
Exit condition: all five dice present faces for possible scoring

Hold dice

Participating actors: a player

This is a low-level use case. The player selects 0 to 4 dice to hold

Extended exception use cases:

1. The system displays an error message if the player attempts to hold all 5 dice
2. The system displays an error message and asks the player to complete her turn by scoring, if the player attempts to hold dice when all 3 rolls has already been made for the current turn

Entry condition: the player has just completed a roll and yet has not made all 3 rolls in the current turn
Exit condition: the player is ready for a next roll holding 0 to 4 dice

Score in a category

Participating actors: a player

This is a low-level use case. The player scores in exactly one of the available categories on the score sheet using dice faces from the last roll. The total or subtotal score is also must be entered or updated.

Extended exception use cases:

1. If the player attempts to enter an incorrect value on the score sheet, the system rejects and asks to enter the correct value.
2. If the player attempts to enter a score value for the game that is not currently being played, the system displays an error message
3. If the player attempts to enter a score value on the other player's score sheet, the system rejects and displays an error message
4. If the player attempts to score in more than one category, the system rejects and displays an error message

Entry condition: the player has just computed possible scoring after a roll
Exit condition: the player has scored and the turn is completed

End game

Participating actors: one to five players

This is a low-level use case. The highest total score wins the game

Entry condition: all players have scored in all 13 categories in the current game
Exit condition: the winner detected, players are ready to start a new game

Section II: Operational Variables

#Ones, #Twos, #Trees, #Fours, #Fives, #Sixes – these are five operational variables each holding a number of dice caring the same face (1,2,3,4,5 or 6) after a roll has been made by any player taking turn. For example, #Ones variable is the number of dice rolled with face 1. These variables can have values from 0 to 5.

Aces score,   Twos score,   Threes Score,   Fives Score,   Sixes Score,   3ofAKind score, 4ofAkind score,   Full House score,   Small Straight score,   Large Straight score, Yahtzee score,   Chance score   -   these are 13 operational variables each holding score value for each of the scoring categories accordingly after a roll was made by any player taking turn. These variables are local to any single roll.

Aces_PlayerX,   Twos_PlayerX,   Threes_PlayerX,   Fives_PlayerX,   Sixes_PlayerX, 3ofAKind_PlayerX,   4ofAkin_ PlayerX,   Full House_PlayerX,   Small Straigh_ PlayerX, Large Straight_PlayerX,   Yahtzee_PlayerX,   Chance_PlayerX   -   these are 13 operational variables each holding score value for each of the scoring categories for any particular player X in a single game. Each participating player has a set of these variables. The sets of these variables are local to any single game.

Yahtzee Bonus_PlayerX - a variable for each player to hold yahtzee bonus score

Total score – this variable holds a total score or a sub-total score computed for any single player X after scoring was entered successfully and recorded. The entered score for total score category is checked against this variable.

Entered Score – this variable holds a value entered by any player

Section III: Operational Relations

Operational relations for <u>Score in a category</u> use case. This relations addressing any player X attempting to score in any turn.

Note: To ease the reading, the large table was divided into smaller tables, each sub-table addresses only one of 13 scoring categories.

Entered score variable in each table represent the value entered in the spot on a score sheet designated for the corresponding category. If entered score is accepted, the value is recorded in corresponding operational variable in playerX's set of operational variables holding scores in categories. For example, if player X scores in Chance Category and the value is accepted, it is recorded in operational variable Chance_PlayerX of the player X.

Aces Category

Variant	#Ones	#Twos	#Threes	#Fours	#Fives	#Sixes	Aces Score	Entered score	Result
1	1	0 - 4	0 - 4	0 - 4	0 - 4	0 - 4	1	matches	recorded
2	2	0 - 3	0 - 3	0 - 3	0 - 3	0 - 3	2	matches	recorded
3	3	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	3	matches	recorded
4	4	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	4	matches	recorded
5	5	0	0	0	0	0	5	matches	recorded
6	Any other combination of dice faces						0	matches	recorded
7	DC	DC	DC	DC	DC	DC	DC	does not match	denied

Twos Category

Variant	#Ones	#Twos	#Threes	#Fours	#Fives	#Sixes	Twos Score	Entered score	Result
1	0 - 4	1	0 - 4	0 - 4	0 - 4	0 - 4	2	matches	recorded
2	0 - 3	2	0 - 3	0 - 3	0 - 3	0 - 3	4	matches	recorded
3	0 - 2	3	0 - 2	0 - 2	0 - 2	0 - 2	6	matches	recorded
4	0 - 1	4	0 - 1	0 - 1	0 - 1	0 - 1	8	matches	recorded
5	0	5	0	0	0	0	10	matches	recorded
6	Any other combination of dice faces						0	matches	recorded
7	DC	DC	DC	DC	DC	DC	DC	does not match	denied

Threes Category

Variant	#Ones	#Twos	#Threes	#Fours	#Fives	#Sixes	Threes Score	Entered score	Result
1	0 - 4	0 - 4	1	0 - 4	0 - 4	0 - 4	3	matches	recorded
2	0 - 3	0 - 3	2	0 - 3	0 - 3	0 - 3	6	matches	recorded
3	0 - 2	0 - 2	3	0 - 2	0 - 2	0 - 2	9	matches	recorded
4	0 - 1	0 - 1	4	0 - 1	0 - 1	0 - 1	12	matches	recorded
5	0	0	5	0	0	0	15	matches	recorded
6	Any other combination of dice faces						0	matches	recorded
7	DC	DC	DC	DC	DC	DC	DC	does not match	denied

Fours Category

Variant	#Ones	#Twos	#Threes	#Fours	#Fives	#Sixes	Fours Score	Entered score	Result
1	0 - 4	0 - 4	0 - 4	1	0 - 4	0 - 4	3	matches	recorded
2	0 - 3	0 - 3	0 - 3	2	0 - 3	0 - 3	6	matches	recorded
3	0 - 2	0 - 2	0 - 2	3	0 - 2	0 - 2	9	matches	recorded
4	0 - 1	0 - 1	0 - 1	4	0 - 1	0 - 1	12	matches	recorded
5	0	0	0	5	0	0	15	matches	recorded
6	Any other combination of dice faces						0	matches	recorded
7	DC	DC	DC	DC	DC	DC	DC	does not match	denied

Fives Category

Variant	#Ones	#Twos	#Threes	#Fours	#Fives	#Sixes	Fives Score	Entered score	Result
1	0 - 4	0 - 4	0 - 4	0 - 4	1	0 - 4	5	matches	recorded
2	0 - 3	0 - 3	0 - 3	0 - 3	2	0 - 3	10	matches	recorded
3	0 - 2	0 - 2	0 - 2	0 - 2	3	0 - 2	15	matches	recorded
4	0 - 1	0 - 1	0 - 1	0 - 1	4	0 - 1	20	matches	recorded
5	0	0	0	0	5	0	25	matches	recorded
6	Any other combination of dice faces						0	matches	recorded
7	DC	DC	DC	DC	DC	DC	DC	does not match	denied

Sixes Category

Variant	#Ones	#Twos	#Threes	#Fours	#Fives	#Sixes	Sixes Score	Entered score	Result
1	0 - 4	0 - 4	0 - 4	0 - 4	0 - 4	1	6	matches	recorded
2	0 - 3	0 - 3	0 - 3	0 - 3	0 - 3	2	12	matches	recorded
3	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	3	18	matches	recorded
4	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	4	24	matches	recorded
5	0	0	0	0	0	5	30	matches	recorded
6	Any other combination of dice faces						0	matches	recorded
7	DC	DC	DC	DC	DC	DC	DC	does not match	denied

3ofAKind score Category

Variant	#Ones	#Twos	#Threes	#Fours	#Fives	#Sixes	3ofAKind Score	Entered score	Result
1	3 - 5	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	Sum of all dice	matches	recorded
2	0 - 2	3 - 5	0 - 2	0 - 2	0 - 2	0 - 2	Sum of all dice	matches	recorded
3	0 - 2	0 - 2	3 - 5	0 - 2	0 - 2	0 - 2	Sum of all dice	matches	recorded
4	0 - 2	0 - 2	0 - 2	3 - 5	0 - 2	0 - 2	Sum of all dice	matches	recorded
5	0 - 2	0 - 2	0 - 2	0 - 2	3 - 5	0 - 2	Sum of all dice	matches	recorded
6	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	3 - 5	Sum of all dice	matches	recorded
7	Any other combination of dice faces						0	matches	recorded
8	DC	DC	DC	DC	DC	DC	Sum of all dice	does not match	denied

4ofAKind score Category

Variant	#Ones	#Twos	#Threes	#Fours	#Fives	#Sixes	4ofAKind Score	Entered score	recorded
1	4 - 5	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	Sum of all dice	matches	recorded
2	0 - 1	4 - 5	0 - 1	0 - 1	0 - 1	0 - 1	Sum of all dice	matches	recorded
3	0 - 1	0 - 1	4 - 5	0 - 1	0 - 1	0 - 1	Sum of all dice	matches	recorded
4	0 - 1	0 - 1	0 - 1	4 - 5	0 - 1	0 - 1	Sum of all dice	matches	recorded
5	0 - 1	0 - 1	0 - 1	0 - 1	4 - 5	0 - 1	Sum of all dice	matches	recorded
6	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	4 - 5	Sum of all dice	matches	recorded
7	Any other combination of dice faces						0	matches	recorded

| 8 | DC | DC | DC | DC | DC | DC | Sum of all dice | does not match | denied |

Full House score Category

Variant	#Ones	#Twos	#Threes	#Fours	#Fives	#Sixes	Full House Score	Entered score	Result
1	3	2	0	0	0	0	25	matches	recorded
2	3	0	2	0	0	0	25	matches	recorded
3	3	0	0	2	0	0	25	matches	recorded
4	3	0	0	0	2	0	25	matches	recorded
5	3	0	0	0	0	2	25	matches	recorded
6	2	3	0	0	0	0	25	matches	recorded
7	0	3	2	0	0	0	25	matches	recorded
8	0	3	0	2	0	0	25	matches	recorded
9	0	3	0	0	2	0	25	matches	recorded
10	0	3	0	0	0	2	25	matches	recorded
11	2	0	3	0	0	0	25	matches	recorded
12	0	2	3	0	0	0	25	matches	recorded
13	0	0	3	2	0	0	25	matches	recorded
14	0	0	3	0	2	0	25	matches	recorded
15	0	0	3	0	0	2	25	matches	recorded
16	2	0	0	3	0	0	25	matches	recorded
17	0	2	0	3	0	0	25	matches	recorded
18	0	0	2	3	0	0	25	matches	recorded
19	0	0	0	3	2	0	25	matches	recorded
20	0	0	0	3	0	2	25	matches	recorded
21	2	0	0	0	3	0	25	matches	recorded
22	0	2	0	0	3	0	25	matches	recorded
23	0	0	2	0	3	0	25	matches	recorded
24	0	0	0	2	3	0	25	matches	recorded
25	0	0	0	0	3	2	25	matches	recorded
26	2	0	0	0	0	3	25	matches	recorded
27	0	2	0	0	0	3	25	matches	recorded
28	0	0	2	0	0	3	25	matches	recorded
29	0	0	0	2	0	3	25	matches	recorded
30	0	0	0	0	2	3	25	matches	recorded
31	Any other combination of dice faces						0	matches	recorded
32	DC	DC	DC	DC	DC	DC	valid value	does not match	denied

Small Straight Category

Variant	#Ones	#Twos	#Threes	#Fours	#Fives	#Sixes	Small Straight Score	Entered score	Result
1	1 - 2	1 - 2	1 - 2	1 - 2	0 - 1	0 - 1	30	matches	recorded
2	0 - 1	1 - 2	1 - 2	1 - 2	1 - 2	0 - 1	30	matches	recorded
3	0 - 1	0 - 1	1 - 2	1 - 2	1 - 2	1 - 2	30	matches	recorded
4	Any other combination of dice faces						0	matches	accept
5	DC	DC	DC	DC	DC	DC	DC	does not match	denied

Large Straight Category

Variant	#Ones	#Twos	#Threes	#Fours	#Fives	#Sixes	Large Straight Score	Entered score	Result
1	1	1	1	1	1	0	40	matches	recorded
2	0	1	1	1	1	1	40	matches	recorded
3	Any other combination of dice faces						0	matches	recorded
4	DC	DC	DC	DC	DC	DC	DC	does not match	denied

Yahtzee Category If bonus result is yes, extra 100 score is added to Yahtzee Bonus_PlayerX variable

Variant	#Ones	#Twos	#Threes	#Fours	#Fives	#Sixes	Yahtzee Score	Entered score	Yahtzee_PlayerX	Result	Bonus result
1	5	0	0	0	0	0	50	matches	50	recorded	yes
2	5	0	0	0	0	0	50	matches	0	recorded	no
3	0	5	0	0	0	0	50	matches	50	recorded	yes
4	0	5	0	0	0	0	50	matches	0	recorded	no
5	0	0	5	0	0	0	50	matches	50	recorded	yes
6	0	0	5	0	0	0	50	matches	0	recorded	no
7	0	0	0	5	0	0	50	matches	50	recorded	yes
8	0	0	0	5	0	0	50	matches	0	recorded	no
9	0	0	0	0	5	0	50	matches	50	recorded	yes
10	0	0	0	0	5	0	50	matches	0	recorded	no
11	0	0	0	0	0	5	50	matches	50	recorded	yes
12	0	0	0	0	0	5	50	matches	0	recorded	no
13	Any other combination of dice faces						0	matches	DC	recorded	no
14	DC	DC	DC	DC	DC	DC	DC	does not match	DC	denied	no

Chance Category

Variant	#Ones	#Twos	#Threes	#Fours	#Fives	#Sixes	Chance Score	Entered score	Result
1	Any combination of dice faces						Sum of all dice	matches	recorded
2	Any combination of dice faces						Sum of all dice	does not match	denied

Total score

Variant	Total score	Entered score	Result
1	Sum of all score variables in playerX's set + Yahtzee Bonus_PlayerX	matches	recorded
2	Sum of all score variables in playerX's set + Yahtzee Bonus_PlayerX	does not match	denied
3	Sum of all score variables in playerX's set + Yahtzee Bonus_PlayerX	nothing entered	Error