

Challenge: Score a bowling game

The purpose of this challenge is to implement a system that can act as a scoreboard for a bowling game.

UI is not a necessity, but it should be possible to exercise the code to validate the implementation somehow.

The design of the system is left entirely open, but design choices should be motivated in a short readme file.

The implementation should be done in .NET.

The process

If there are questions regarding the challenge, please feel free to mail or call Steen Lykke Jeppesen.

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Hand in should be done via email to Steen Lykke Jeppesen as well.

The rules of bowling

A bowling game consists of 10 frames in which players try to knock down 10 pins at the end of a lane by rolling a bowling ball.

In every frame the player can roll one or two times. The actual number depends on strikes and spares.

The score of a frame is the number of knocked down pins plus bonuses for strikes and spares. After every frame the 10 pins are reset.

Strikes

The player has a strike if he knocks down all 10 pins with the first roll in a frame. The frame ends immediately (since there are no pins left for a second roll). The bonus for that frame is the number of pins knocked down by the next two rolls. That would be the next frame, unless the player rolls another strike.

Spares

The player has a spare if he knocks down all 10 pins with the two rolls of a frame. The bonus for that frame is the number of pins knocked down by the next roll (first roll of next frame).

10th frame

If the player rolls a strike or spare in the 10th frame they can roll the additional balls for the bonus. But they can never roll more than 3 balls in the 10th frame. The additional rolls only count for the bonus not for the regular frame count.

10, 10, 10 in the 10th frame gives 30 points
(10 points for the regular first strike and 20 points for the bonus).

1, 9, 10 in the 10th frame gives 20 points
(10 points for the regular spare and 10 points for the bonus).

Gutter Game

A Gutter Game is when the player never hits a pin (20 zero scores).

Perfect Game

A Perfect Game is when the player rolls 12 strikes (10 regular strikes and 2 strikes for the bonus in the 10th frame). The Perfect Game scores 300 points.

In the image below you can find some score examples.

More about ten pin bowling here: http://en.wikipedia.org/wiki/Ten-pin_bowling

Example score

Frame	Roll	Knocked down pins	Total score	Notes
1	1	1		
1	2	4	5	
2	1	4		
2	2	5	14	
3	1	6		
3	2	4	29	Spare: 10 pins plus bonus of 5 from next roll (roll 1 of frame 4)
4	1	5		
4	2	5	49	Spare: 10 pins plus bonus of 10 from next roll (roll 1 frame 5)
5	1	10		Strike
5	2		60	Strike: 10 pins plus bonus of 1 from next frame (rolls 1 and 2 from frame 6)
6	1	0		Bad luck
6	2	1	61	
7	1	7		
7	2	3	77	Spare
8	1	6		
8	2	4	97	Spare
9	1	10		Strike
9	2		117	
10	1	2		
10	2	8		Spare
10	3	6	133	Extra roll due to spare in 10th frame