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Tank War Evaluation Guide

NOTE: It was an oversight of us when writing our functional requirement #6, #7, and #11 that a round is not a game. Therefore, if it read "If a cannonball hits its opponent, it destroys that tank and wins the game." It was actually supposed to say "If a cannonball hits its opponent, it destroys that tank and wins the round."

Before we start, here are some general controls and instructions for the game:

- The W, A, S, D keys are used to control the movements of the bottom (red) tank
- The arrow keys are used to control the movements of the top (blue) tank
- You can move the tank forward by pressing the corresponding up key and move the tank backward by pressing the corresponding down key
- Pressing the corresponding left and right keys will rotate the tank 90 degrees either clockwise or counterclockwise
- To shoot a cannonball from the red tank, press j
- To shoot a cannonball from the blue tank, press p
- The randomly generated walls that make up the maze-like structure can be destroyed only if a cannonball from either tank is shot at it
- To win the round either hit the opponent's base (the white square) or tank with a cannonball or drive your tank so that it touches the opponent's base
- Each game is comprised of 11 non-tie rounds (not counting rounds where both opponents destroy each other at the same time), in the end, the player with the most amount of points wins

Favorite model tests

- Test 1: Movement of tanks - Lines (1748 - 1818)
This test demonstrates not only that the controls for the tanks work, it also shows that the player can hold down the forward key (W or up) while having the tank rotate clockwise or counterclockwise, and the forward direction in which the tank moves will change accordingly.
- Test 2: Both cannonballs hit the other opponent tank at the same time - Lines (2003 - 2029)
This test demonstrates that in the rare case where both cannonballs hit the opposite opponent at the same time, the round will reset without giving either player a point.
- Test 3: Dead cannonballs touches wall - Lines (2031 - 2064)
This test demonstrates that when the cannonball is not live, such as when it is stuck to the tank, if it touches a wall, the wall will not be destroyed.
- Test 4: Two cannonballs collide - Lines (2237 - 2251)
This test demonstrates that when two live cannonballs hit each other, they will annihilate each

other and return to the dead state, not affecting the player's score

- Test 5: Game ends after 11 non-tie - Lines (2336 - 2345)
This test demonstrates that the model successfully sets the game to be over after 11 non-tie rounds and gives us the correct winner.

Functional requirement hints

1. One tank is moved by keys "WASD" and the other is moved by arrow keys
Start the game. Observe that when the A or the left arrow is pressed, the corresponding tank turns 90 degrees in the counterclockwise direction. Observe that when D or the right arrow is pressed, the corresponding tank turns 90 degrees in the clockwise direction. Observe that when W or the up arrow is pressed, the corresponding tank moves forward. Observe that when S or the down arrow is pressed, the corresponding tank moves backward. Try pressing the corresponding right or left keys to rotate the tanks while W or up, and S or down keys are pressed, notice how the tank's direction of forward and backward motion changes accordingly.
2. When cannonballs are not fired(dead), they are stuck to the tanks
Start the game. Move both tanks around, observe that the corresponding red and blue cannonballs are always stuck to the tanks, pointing in the direction of the forward movement. To observe the cannonball in dead state, move each tank to the wall in such a way that the cannonball for that tank is touching the wall (see Figure 1). Observe that the wall is not destroyed when the cannonball is touching it.

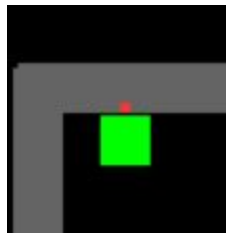


Figure 1

3. One player can fire a cannonball by pressing key "j," and the other can do so by pressing key "p," transitioning cannonballs from dead to live state
Start the game. Press "j" and observe a cannonball being fired from the red bottom (red) tank. Then press "p" and observe the cannonball being fired from the top (blue) tank. To observe the cannonballs in a live state, fire both tank's cannonball at a wall and watch as the wall gets destroyed.
4. When one cannonball is released, it travels vertically from the tank that fires it to the other side of the screen
Start the game. Move either tank to the rightmost or leftmost part of the screen. If moving the top (blue) tank rotate the tank so that it is facing the bottom side of the screen. If moving the bottom (red) tank, rotate the tank so that it is facing the top side of the screen. Press either "j"

or “p” to fire a cannonball from the red or blue tank respectively. Observe as the cannon travels vertically from the tank to the other side of the screen, then getting reset into its dead state stuck onto the tank.

5. If the cannonball hits a wall brick, it destroys that brick and transitions back to the dead state

Start the game. Fire a cannonball from either tank at a wall. Observe as the wall gets destroyed by the cannonball and cannonball returns back to its original position in front of the tank. Now move the tank to the wall in such a way that the cannonball for that tank is touching the wall (see Figure 1). Verify that the wall is not destroyed since the ball is in a dead state.

6. If a cannonball hits its opponent, it destroys that tank and wins the round

Start the game. Move the top (blue) tank out of the base. Move the bottom (red) tank to be in clear sight of the blue tank such that when the red tank fires a cannonball, it will hit the blue tank. Press “j” to fire a cannonball from the red tank. Observe that the gameboard resets after the blue tank has been hit and the red player’s (player 2) score increases by 1. Repeat the same for the blue tank, this time having the blue tank fire at the red tank after the red tank is out of the base. Observe that the gameboard resets once again and this time, the blue player’s (player 1) score increases by 1.

7. If a cannonball hits its opponent’s base, it destroys that base and wins the round

Start the game. Move the top (blue) tank completely out of the base. Move the bottom (red) tank to be in clear sight of the blue tank’s base. such that when the red tank fires a cannonball, it will hit the blue tank’s base but not the blue tank itself. Press “j” to fire a cannonball from the red tank. Observe that the gameboard resets after the blue base has been hit and the red player’s (player 2) score increases by 1. Repeat the same for the blue tank, this time having the blue tank fire at the red base after the red tank is completely out of the base. observe that the gameboard resets once again and this time, the blue player’s (player 1) score increases by 1.

8. If two cannonballs collide, they will both be destroyed

Start the game. Maneuver both tanks into the position as seen in Figure 2 below. Press both keys “j” and “p” together to fire a cannonball from both tanks. Observe as the cannonballs collide and annihilate each other, not hitting the tanks and therefore not resetting the board or increasing either player’s scores.

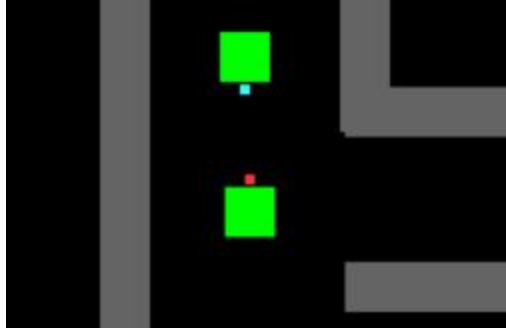


Figure 2

9. If a cannonball strikes the top, side, or bottom of the screen, it transitions back to its dead state

Start the game. Choose either tank. Move the tank such that firing the cannonball in any of the 4 directions will not hit the opponent's base or tank. Continue firing cannonballs until there are no walls between either of the 4 possible firing directions. Fire a cannonball, each in 1 of the 4 directions, and observe that as they hit the 4 sides of the screen, that cannonball resets back to be stuck to the tank. Test that the cannonball is dead using what was done before as seen in Figure 1. Repeat the same for the other tank.

10. Neither tank can move outside of the screen, when either of them touches the edge of the screen, they won't be able to move in that direction

Start the game. Maneuver the red tank to the right edge of the screen, notice that the tank can no longer move further to the right. Maneuver the red tank to the left edge of the screen, notice that the tank can no longer move further to the left. Maneuver the bottom (red) tank to the top edge of the screen, notice that the tank can no longer move further to the top. Maneuver the red tank to the bottom edge of the screen, notice that the tank can no longer move further to the bottom. Repeat these steps for the top (blue) tank.

11. If a tank collides with its opponent's base, that base will be destroyed, and this tank wins the round

Start the game. Move the top (blue) tank anywhere, either inside or outside of its white base. Maneuver the bottom (red) tank such that it touches the blue tank's base. Observe that the board gets reset and the red player's (player 2) score increases by 1. Repeat the same for the blue tank touching the red tank's base. Observe that the board gets reset and the blue player's (player2) score increases by 1.

12. All randomly generated wall bricks can only be generated between the two bases and within the screen dimension

When the game begins, observe that the gray wall bricks do not cover other components of the game, especially the two player's bases or the tanks.

To observe that all wall bricks are generated within the screen dimension, look at the unit test on lines (1725 - 1744) where each wall in a vector of walls from the "board" object is checked to be within the scene dimension.