Longlevens Library Code Club

Apollo Moon Landings 50th Anniversary Project

July 2019 marks the 50th anniversary of the first manned mission to the Moon. Five more Apollo missions successfully landed over the next 3½ years. Your mission is to create a game to land a spaceship of your own design onto the Moon's surface six times. Each time the difficulty of landing shall be increased just as it was with the real missions. Note that a Raspberry Pi computer is tremendously more powerful than the computer aboard the Apollo spacecraft!

Instructions

1. At the beginning of each mission your spaceship shall be flying horizontally above the surface of the moon at a horizontal speed of 20 units per second close to the top and the side of the screen it is moving away from. The Moon's gravity shall cause the spaceship to fall faster towards the surface by increasing the downwards speed by 2 units every second.

2. You must provide controls to rotate the spaceship clockwise and anti-clockwise so that the craft can be turned to land vertically. The craft shall have a large engine to slow it down as it approaches the surface in both the horizontal and vertical directions. Show a flame shooting from the engine whenever the engine is used. The speed of the spaceship shall increase by 2 units every second that the engine is burning in the direction the spaceship's nose is pointing. (You may need help with the calculations required.)

3. The surface of the Moon for the first mission shall be flat just above the bottom of the screen. In the next mission add a crater, a boulder and a hill. Then for mission 2 create a surface with 2 craters, 2 boulders and 2 hills and then for mission 3 have 3 of each and so on as the missions progress.

4. A player shall successfully complete a mission by landing your spaceship on the moon upright on a level surface, at a speed of more than 4 units per second in either the horizontal or vertical direction. If the spaceship touches the surface faster than that or touches a hill or a crater it shall explode on impact!

Extras

1. Add legs to the spaceship that must be lowered before landing.

2. Add a fuel gauge that allows only so much use of the engine before it fails and the spacecraft plummets out of the player's control to the Moon's surface and explodes.

3. Add a timer to record the speed the player takes to complete all 6 missions successfully. Add a best time(s) score table to record the fastest times with the names of the players.

4. Move to the next level's landing site by taking off from the level before. The player must have retained enough fuel to beat the Moon's gravity to reach the top of the screen and turn horizontal and accelerate to 20 units per second with legs raised.

5. Include code to automatically control what happens when the spaceship reaches the left, right or top of the screen while in flight.

6. Change from the Moon to planets in our Solar System or beyond! Vary the amount of gravity and invent new obstacles to avoid for a safe landing.