

Soft Landing Project – Human Pilot – Program Concept

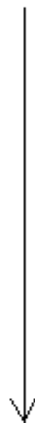
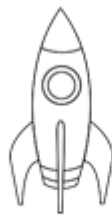
The program will simulate landing a space ship on a celestial body like a planet. The space ship starts at an initial speed and an initial altitude above the planet. As the ship travels towards the planet, the speed will increase with time due to gravity of the planet. If the ship lands at too high of a speed, it will crash. The pilot can slow down the ship by applying thrust (think brakes). Each unit of thrust uses up fuel.

The first part of the project focuses on designing this program for a user to act as the pilot. The program should show the status of the ship with regard to the current altitude, speed and fuel and allow the user to enter values for thrust. Once the user has entered a valid value for thrust, the program should apply the thrust to the ship. This process should repeat until the ship has landed. The challenge for the user is to apply thrust strategically so that the ship does not run out of fuel. When the ship has landed, the program should display a message to the user indicating whether they have landed the ship successfully or the ship has crashed.

Your program will be modeling what happens over the duration of the time your ship is traveling. To do this, you will simulate what happens during one second of time and then continually repeat until your ship has landed. However, you will not be using ACTUAL time. Instead you will SIMULATE what happens in a second. For this system, in one second of time, all of the following steps occur:

- display current status of altitude, speed and fuel
- allow use to enter the next thrust value they want to apply
- apply the thrust – update its effect on fuel and speed
- update altitude and speed to reflect the effect of one more second of time

Here is a visual representation of an example with initial conditions different than the ones in the moodle description. **NOTE: You do not need to program any graphics !!!!**



| At Time equals 0 second | |
|-------------------------|-----|
| Altitude | 200 |
| Speed | 60 |
| Fuel | 25 |

| At Time equals 1 second | |
|-------------------------|-------|
| Altitude | 138.4 |
| Speed | 61.6 |
| Fuel | 25 |



| At Time equals 14 second | |
|--------------------------|-----|
| Altitude | 0 |
| Speed | 2.7 |
| Fuel | 5 |