*Space Panther Final Iteration*

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Use case 1

**Title**: Have a single planet simulated in the game

**Actor**: ~~user of the gam~~e a physics student or astronomy student

**Description**: The user would like to simulate movements of a planet with certain mass, start coordinates and velocity, radius and user-defined name of the planet

**Basic Flow**:

1. The user clicks on the game editor’s run button
2. The game editor opens up a game with the main\_scene screen that has a start menu with 3 buttons that allow user to select form: play a new game, load the previous game only if there are games previously saved by the user or exit
3. The user clicks on play the game button
   1. Or exit button
   2. Or load prev. game
4. The game moves to the main menu screen ~~that displays the information that the user needs to enter in order to start the game:mass, coordinates and velocity. The message box prompts the user to enter numeric values that are floats (with precision of 4 symbols after the dot). In addition, main menu has 3 buttons: add planet, play and exit.~~ that has plus button, back button, slow down, speed up , zoom in and zoom out buttons.
   1. The software closes the game screen and the user cannot play anymore.
   2. The software moves to load previous game screen (follows user story 3)
5. The user presses the plus button and the software pop ups a menu with the data that the user needs to enter: planet’s name, mass, radius, coordinates and velocity and has add, simulate, save, exit button
   1. User presses slow down/speed up button and software adjusts the time scale for the 3d simulation accordingly
   2. User presses zoom in or zoom out buttons and the software moves the camera closer or further from the origin point on the screen
6. The user enters the data which could be one of the following:
   1. Any values for the name of the planet are accepted of the length of 20 characters
   2. Radius is validated for positive values and follows the same pattern as mass
   3. The user enters positive float/integer values for mass, positive or negative float/integer values for each of the coordinates (x, y, z) and velocities (Vx, Vy, Vz).
   4. The user enters negative float/integer values for mass, positive or negative float/integer values for each of the coordinates and velocities.
   5. The user enters non numeric values for all parameters.
   6. The user enters non numeric value for mass and the rest are positive or negative numeric values.
   7. The user enters positive numeric value for mass and a non numeric value for one of the other parameters or all of the rest of parameters.
   8. Or presses the play button, then the flow goes to 8.a.i
7. The response of the software is triggered after user enters the information in the text cell for:
   1. No error messages or warning show up
   2. The message is displayed on top to enter only positive numeric values for mass since it cannot be negative
   3. The messages to enter numeric values are displayed right after the user enters non numeric value in the cell and for each of the cell that gets the non numeric value
   4. The message is displayed to enter numeric value for mass
   5. As 6c but no message for the mass comes out
8. The user can choose:
   1. Press Add button
      1. Or press ~~Play~~ Simulate button
      2. Save button
      3. Exit button and software exits the screen
   2. Do 7a.
      1. or follow the displayed message and re-enter value for the mass which could follow any of the 6a-e
   3. to e are the same as 7b.
9. The response of the software:
   1. After pressing the ~~add~~ simulate planet button, the software checks one more time that the values for mass are numeric and positive and the rest of the parameters are numeric positive or negative values. Since data will pass the check - it will be saved in to the globally available singleton’s class dictionary. And the software will do 8.a.i.1.
      1. Or if pressed play button, then the software checks if the data was saved:
         1. If it was, then the menu scene is deleted and the software moves to the play scene to simulate the planet
         2. If it was not saved, then the message is displayed to save the planets info before pressing the play button on the same screen
      2. If the save button pressed than the software will check if there is anydate saved and if there is data, the software will validate data following the same pattern discussed above and if it was validated, teh software will save the data to the database. If the data will no go though the data validation, then the software will prompt the user to correct the data and try again. if there is no data added when the user pressed save than the error message will prompt the user to add data first before attempting to save the data.
         1. to c if did 7 a, then will follow 8 a if pressed add button, but will not pass the data check since it was not corrected, so software will redisplay the same helpful messages, or will follow 8.a.i.2 and then 8a if pressed play button
      3. If the user corrected the entered data, the software will remove the error messages
10. The user :
    1. Can press exit button which will prompt the software to exit the game and display the start menu
    2. After correcting the input, can press the one of the buttons, which will follow the 8a
    3. Press simulate button and observe the planet simulated

10. The user can press exit button, then the software will exit, or choose to play another game, which will start the flow from 2.

Use case 2

**Title**: Have multiple planets simulated in the game

**Actor**:~~user of the gam~~e a physics student or astronomy student

**Description**: The user would like to simulate movements of several planets with certain mass, start coordinates and velocity, names,radius

**Basic Flow**:

1. will be the same upto 8, then after entering the data, the user can:
   1. Press add button:
      1. If the input is valid (as was discussed above) the software will add the data to the planets\_dict
         1. The user then can:
            1. Press the play button:

If only 1 planet was entered , then the flow will follow the flow of a single planet game as discussed earlier used case

If more than one planet was entered than planets will be added to the simulation in order they were entered by the user

* + - * 1. Enter another set of data, in this case the flow will follow the same as discussed above till 8. and will start this case’s flow from 1. The user will also have an option to choose the planet to orbit for the planets already added

Then the flow will repeat from 1

* + - * 1. Exit the game, then the software will display the start menu
        2. Save the data including the orbits which will follow user story 1.9.ii
  1. Press play button:
     1. The software will check if the current data was saved:
        1. If it was saved:
           1. Then the flow will go from 1.a.i.1a.
        2. If was not saved, the user will be prompted to save the data and the flow will start from 1
  2. Press exit button
     1. The software will move to the start menu with the choice of playing a new game or exiting the game for good.

Use case 3

**Title**: Delete the previous simulations saved

**Actor**:a physics student or astronomy student

**Description**: The user would like to delete previously saved simulations data that includes the name of the planet, the radius, the mass, coordinates and velocities.

**Basic Flow**:

1. Once the user started the game, the software goes to the start menu
2. The user chooses the load previous games which is enabled only if the user had previously saved games
3. The software will display the menu with the scroll list with the names of the projects and play new game and exit buttons
4. The user presses the name of the project from the scroll menu options and the software adds an additional section of the menu to the screen that will display the data of the project chosen by the user with additional buttons: delete project, load project
5. The user can press the delete project and the software will discard the data from the database and display the message that the project was deleted
6. User can press load the game, choose another project (if there were more than one project saved) or play new game or exit
7. If load the game was pressed: follow use case 4 if choose another project- the same cycle will be repeated, if play new game- the use case1-2, exit will exit the screen

Use case 4

**Title**: Load/replay the previous simulations saved

**Actor**:a physics student or astronomy student

**Description**: The user would like to simulate previously saved simulations data that includes the name of the planet, the radius, the mass, coordinates and velocities.

**Basic Flow**:

1. The same as the use case 3 till 5.
2. The user will press load the project and the software will open the simulation with the number and data that was displayed in the previous screen
3. The screen of the simulation has plus button, speed up/slow down and from this point the flow can follow previous use cases

Use case 5

**Title**: observe the planets simulated

**Actor**:a physics student or astronomy student

**Description**: The user would like to observe the simulated planets from different angles

**Basic Flow**:

1. The same as any other use case till the user gets to the simulation screen
2. The screen of the simulation has plus button, speed up/slow down.
3. If the user presses the speed up/slow down buttons, the software will speed or slow down the movement of the planets
4. The user can use arrow buttons on the keyboard to navigate the 3D space of the simulation: and the software will direct the camera in the direction of the arrow used:left, right, top, bottom.