

1) (5 points) Identify a new software feature. Describe how your feature will behave (requirements).

Feature	Requirements
Share to Twitter	Appears as a button on the game over menu Optional button When pressed, Twitter opens and displays the message, "I just played Astroworld! I scored [points] points!" The [points] must display how many points the player got in that round If button is pressed, the game over screen does not disappear, it waits for player to come back Button disappears when the game over menu is closed
Slow down enemies (Power up)	When picked up it makes the enemies move down the screen at speed 2 After the power up duration (7 seconds), enemies return to their original speed Like the other power ups, slow down enemies should be released randomly when a player destroys an enemy Slow down has the same requirements as Power Up
Sounds	Sound is played when a significant event happens (explosion, destroy enemies, game over, shooting weapons, and hero loses shield) Sound does not loop, it is only played once Sound plays immediately after event, there is no delay Each weapon that hero has plays a different sound Game over sound is played when hero dies or reaches level 10 (when game over menu is opened) A power down sound is played every time the hero loses a shield When the enemies are destroyed, a destroy sound is played If hero picks up nuke power up, and then triggers the explosion, an explosion sound is played
Game over menu	Is invoked when Hero loses all their shields or player reaches level 10, whichever is first If Hero loses all their shields, display "Game over, you lose." If Hero reaches level 10, display "Game over, you win!" Appear on top of playing scene (transparent) Displays score that player achieved in that round as "Your score is: [score]" Score is the same as the one displayed during the game Has two buttons, share score and main menu If share score is pressed, do not close the game over menu If main menu is pressed, open main menu and close game over menu
Level Transition	Display the level when Hero receives enough points to advance Display level for 3 seconds then disappear Level is the same as the level in the game Level should not interfere with the rest of the game

Pause menu	<p>Freeze the game in the background so that no enemies or the ship can move out of their place before becoming frozen</p> <p>Screen has a pause button in the top right hand that freezes the game and opens the pause menu</p> <p>Game can also be paused by clicking “P” on the keyboard</p> <p>Has two buttons, Resume and Quit</p> <p>Each button has to become a faded black to indicate mouse has hovered over and becomes more opaque when pressed</p> <p>When Resume is clicked or “P” is clicked while the pause menu is opened, the game unfreezes and everything resumes to how it was before the game was paused</p> <p>Game can only be paused while the game is running and not on the main menu or game over</p>
Enemy that destroys the ship	<p>Enemy moves from the left side to the right side while spinning and floating up and down</p> <p>When it hits the right side, it switches and moves in the left direction and spins clockwise</p> <p>When it hits the left side, it switched amoves in the right direction and spins counter-clockwise</p> <p>Enemy drops bombs at 2 sec intervals</p> <p>The bombs can destroy the hero but the hero cannot shoot at the bombs, they are only destroyed when they get out of the scene</p> <p>Enemy has 10 lives and worth 200 points</p>
Power Up	<p>Power up should should be released randomly when a player destroys an enemy but should not appear every time an enemy is destroyed, only randomly. A power up effect is then given to the player and after the power up duration, effects are reverted. Some of these may not apply to Double points power up.</p> <p>Power up fades gradually if Hero does not pick it up.</p> <p>The chance that any power up appearing is the same.</p> <p>A plasma effect and a radial timer is instantiated on screen when power up is picked up.</p>
Double points (Power up)	<p>When picked up it doubles the points gained by destroying the enemies.</p> <p>After the power up duration (7 seconds), destroying enemies reward you with the default points.</p> <p>Like the other power ups, Double points should be released randomly when a player destroys an enemy.</p> <p>Power up should not appear every time an enemy is destroyed, only randomly</p> <p>Double points has the same probability of appearing as the other power ups (no more, no less)</p> <p>Double Points lasts 7 seconds</p>
Invincibility (Power up)	<p>When picked up it, Hero is invincible and his shield level does not decrease when colliding with enemies.</p> <p>After the power up duration (7 seconds), shield level decreases when colliding with enemies</p>

	<p>Power up should not appear every time an enemy is destroyed, only randomly</p> <p>Invincibility points has the same probability of appearing as the other power ups (no more, no less)</p> <p>Invincibility lasts 7 seconds</p>
Nuke (Power Up)	<p>When picked up, user has the chance of pressing space bar to destroy all enemies on screen by changing selected weapon to the destroyer weapon. If spacebar is pressed, an explosion is instantiated on screen and weapon is reverted back to the original selected weapon.</p> <p>Like the other power ups, Nuke should be released randomly when a player destroys an enemy.</p> <p>Power up should not appear every time an enemy is destroyed, only randomly</p> <p>Nuke has the same probability of appearing as the other power ups (no more, no less).</p> <p>After nuke is used, the weapons returns back to the one were using before the nuke</p> <p>Hero keeps the power up until it is used once</p>
Laser (Weapon)	<p>Laser like all other weapons is a laser beam which can be switched to at any time above level 3 to reward the player and to make the harder levels more fun for the player.</p>
Start Menu	<p>The start menu is an interface that the player will interact with before starting the game.</p> <p>This scene should include an options menu which allows the player to change game defaults, buttons to start or quit the game, and a visually appealing background.</p> <p>The player will be able to change volume and the ship for the game from the options menu.</p> <p>Clicking the play button will load the game scene, and the quit button will stop the application.</p>
Level progression	<p>The level progression will be based off of the score a player achieves, making it increasingly difficult with a higher amount of score.</p> <p>The enemies will progressively move faster as levels are increased, as well as increasing their spawning rate.</p> <p>After a few levels, new enemies will spawn to add a level of difficulty to the game.</p>
Level bars	<p>A slider will be added to the level for a visual representation of how far the player is through the level. It will update depending on the current score.</p>
Game music	<p>There will be a more relaxed main menu music, with an upbeat techno soundtrack for the game. The music will change once the play button is clicked on the main menu and the music will stop once a game over is called.</p>

2) (5 points) Define the key components of the new software feature using the object oriented approach.

Feature	Key Components
Share to Twitter	ShareToTwitter is a class that is used in the game over menu to open a new Tweet window.
Slow down enemies (Power up)	Is a type of power up which when picked up by the Hero, will slow down Enemy speed for 7 seconds, then reverts the enemy speed, so it relates to two classes, Hero and Enemy.
Sounds	Sounds is dependent on the Hero actions and will trigger sound effects for significant events (explosion, destroy enemies, game over, shooting weapons, and hero loses shield)
Game over menu	This consists of two buttons: Share score button and main menu button. The share score depends on a ShareToTwitter class which will open a new Tweet window, and the main menu button depends on the MainMenu class which opens the main menu scene. The game over menu also displays a message indicating whether someone has won or lost the game, which depends on the LevelProgression class and the shield level in the Hero class. The game over menu also displays the score, which depends on the ScoreCounter class.
Pause menu	Freezes game in the background and shows pause menu when pause button is clicked or "P" is pressed on the keyboard. On the pause menu, the player can resume the game or quit to end the game, in which it switches to the game over menu.
Enemy that destroys the ship	New enemy UFO inherits attributes from Enemy class that starts spawning after level 3. The UFO spawns bomb like bullets that destroy the ship because they have the tag "Enemy", but they cannot be destroyed themselves.
Double points (Power up)	Is a type of power up that doubles the score in ScoreCounter when the Hero destroys an enemy in the duration of 7 seconds.
Invincibility (Power up)	Is a type of power up that does not damage the ship when they collide with an Enemy for the duration of 7 seconds.
Nuke (Power Up)	Is a type of power up that uses the destroyer weapon declared in the class Weapon that destroys all enemies on screen. The powerup is triggered by the spacebar and

	destroys the active enemies and adds the score of all destroyed enemies through the ScoreCounter class.
Start Menu	This will consist of 3 buttons: play, options, and quit. The play button will simply load the game scene while passing preset defaults. These defaults can be changed by accessing the options button. Here, the player can choose from a selection of ships for their character and change the game volume to their liking. The quit button will exit the application but note that because the game is run in unity, it will not actually exit the application.
Level progression	The level progression works as a controller that listens for the next level, and will update other components of the software. The enemies will spawn at a faster rate every level, and will increase their vertical speed every other level. The level will appear each time the level increases on the screen, as well as text at the top.
Level bars	The level bar is updated from the score counter to update once the score reaches a 5% increment of the preset value of the level. This means that every time the score gets 5% closer to the level-changing score, the slider will be filled up 5% of its maximum. The bar will reset once the score reaches the next level.
Game music	The game music can be set at the options menu using an interactive slider. The main menu music will change as the slider is changed. The value of this volume will be passed to the main scene. The main scene will load the new music, and set the volume to the value passed previously.

3) (10 points) Create UML diagrams such as class diagrams, flowcharts, and sequence diagrams to clearly define the strategy to solve the problem.







