Kaea-Cola Racers:  
Version and Cycle Plan

SE 638-001 - Assignment 3 - Fall 2018

Group Members

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# Who Did What

|  |  |
| --- | --- |
| Members | Responsibilities |
| All members | Overall Game planning and research; Assigning Feature Sets to Cycle Plan |
| Amjad Alghamdi | Section 1, Section 3  Feature Sets: F5: Computer Players; F6: Race Business Rules; F23: Difficulty Level |
| Emily Johnson | Section 5, Section 6, Section 7 (Project Plan), Section 8  Feature Sets: F9: Start and Finish of Race; F10: Accounts; F11: Bottlecaps; F13: Power Boosts and Upgrades; F16: View/Upgrade Mode and Menu; F18: Opening Screen; F19: Shop; F22: Car Upgrades |
| Kavya Kumar | Section 4; Section 2  Feature Sets: F3: Basic Track; F4: Tracks with Loops; F8: Background for Track; F9: Start and Finish of Race; F12: Car Sounds; F14: Music; F15: Lighting |
| Adetayo Olowu | Section 2  Feature Sets: F1: Basic Car Design and Controls; F2: Basic Performance Stats; F7: Car Skins; F12: Car Sounds; F13: Power Boosts and Upgrades; F17: Car Selection Menu; F20: Camera; F21: In-Game Menu; F22: Car Upgrades; F24: Particle Effects |

**Table of Contents**

[Who Did What 1](#_Toc532385138)

[1. Introduction to the game 3](#_Toc532385139)

[2. Project Overview Statement 3](#_Toc532385140)

[3. Version Plan 4](#_Toc532385141)

[3.1 Incremental Version Plan 4](#_Toc532385142)

[3.2 Version Plan Rationale 5](#_Toc532385143)

[4. Version 1 Cycle Plan 5](#_Toc532385144)

[4.1 Cycle Plan Rationale 5](#_Toc532385145)

[4.2 Cycle Plan 5](#_Toc532385146)

[5. Version 1 Work Breakdown Structure (WBS) 7](#_Toc532385147)

[Cycle 1 Feature Decomposition 7](#_Toc532385148)

[Cycle 2 Feature Decomposition 8](#_Toc532385149)

[Cycle 3 Feature Decomposition 8](#_Toc532385150)

[Cycle 4 Feature Decomposition 9](#_Toc532385151)

[Cycle 5 Feature Decomposition 10](#_Toc532385152)

[Cycle 6 Feature Decomposition 11](#_Toc532385153)

[Cycle 7 Feature Decomposition 12](#_Toc532385154)

[Cycle 8 Feature Decomposition 12](#_Toc532385155)

[6. Labor and Effort Estimates 13](#_Toc532385156)

[Resource Initials 13](#_Toc532385157)

[Detailed Pre-Development and Cycle 1 Estimates 13](#_Toc532385158)

[Story Point Assignment 17](#_Toc532385159)

[Version 1 Labor Estimate (in Person-Days) 18](#_Toc532385160)

[7. Project Plan 19](#_Toc532385161)

[8. Executive Summary 20](#_Toc532385162)

[References 21](#_Toc532385163)

[Appendix A: Project Tasks and Duration 22](#_Toc532385164)

# 1. Introduction to the game

Kaea-Cola Racers is a fantasy style car-racing mobile game which allows the player to compete and enjoy all the features that make the race more interesting. Different cars with different colors standing on the start line waiting for the countdown to start the game. One game player will compete with five computer players, the aim of the game is to reach the finish line and winning the first place. During the race will be there some curves with different levels of difficulties and the player's job is to pass through it carefully. The five computer cars will try to get to the finish line before the game player. Kaeakola racing game accomplished by driving fast and avoid collisions with other cars.

This game will give Kaea-Cola a good opportunity to advertise its products by having cars based on the flavors of their sodas. In this game, we have an in-game currency that looks like soda bottles and bottles caps that people can get by paying money or watching ads or completing levels. Moreover, it will allow them to unlock additional tracks and cars. This is how we are showing people Kaea-Cola ads and making money through the game.

The idea of how to control the game is that the game players will hold the phone in their hands and then tilts it like a steering wheel to control the car.

This game will be released in different mobiles phone platforms to reach different users. Finally, we are offering the game free to the people.

# 2. Project Overview Statement

|  |  |  |  |
| --- | --- | --- | --- |
| PROJECT OVERVIEW STATEMENT | Project Name  **Kaea-Cola Racers** | Project No.  **KCR-V1** | Project Manager  **Group 2** |
| **Problem / Opportunity**  Kaea-Cola Racers is a 3D car racing game, similar to Horizon chase, Traffic racer, to mention a few. The concept of the game is to have a player race against multiple AI players on a simple race track, with exciting features such as powerups, upgrades, coins (bottlecaps), etc.  The game is designed for soda lovers in general and lovers of Kaea cola brand specifically. This Kaea-Cola themed game presents an opportunity to generate income by implementing a version of Kaea-Cola Racers on mobile devices, using sprite animation to reduce the complexity of generating graphics. The main effort would be to infuse the right mix of car graphics, speed, effects and upgrades to give racers a new experience at every level and keep them engaged.  The revenue streams from this effort include: advertising and other game promotions, in-game purchases, merchandising.  Kaea-Cola Racers will provide increasingly challenging and exciting gameplay over four versions: Version 1 (single-player, 5 computer players, simple single loop, no obstacles, power ups, two playable cars), Version 2 (new track with additional curves, new car designs, online multiplayer), Version 3 (new tracks, new car designs, online multiplayer invites) and Version 4 (new tracks, new car designs, unlockable achievements, additional cars). The scope of this POS is limited to version 1. | | | |
| **Goal**  The goal is to develop an addictive car racing game that can be played on mobile devices by titling to control the car. This game aims at advertising the Kaea-Cola beverage company. Revenue will be generated through advertisements associated with company, promotions about the different flavors released and merchandising. | | | |
| **Objectives**  Version 1 will:   1. Provide 8 levels of gameplay with incremental level of difficulty, while being relatively simple to play using the control functionalities. 2. Provide the game player with basic controls to play and tracks with parallax backgrounds. 3. Allows the gameplayer to experience competitive racing by providing AI enabled computer cars to keep the game challenging. 4. Provides the users with background music and car sounds to add effects to make it interesting. 5. Provides the users with lighting options to increase the user comfort and satisfaction. 6. Allow the user to pause play or end play on that level by providing menu interface and settings option. 7. Allow the user to build the skill or hands on experience in handling the device to control the virtual automobile in the screen. 8. Allows the game player to contribute to the revenue of the Kaea-Cola company through in-app purchases 9. Increase brand awareness through the representation of the different flavors in-game. | | | |
| **Success Criteria**  The performance and success of the system will be judged according to:   * At least 200 downloads per day within 1 month of release * At least 100k downloads within 8 months of release. * At least 2 rounds of game played per visit. * A 15% click-through or follow-through of tracked visits to sponsoring sites and products. * Revenue from advertising & promotions covers development costs within 8 months of release. * At least 2% increase in soda sales within 12 months of release, due to increased brand awareness. * A 9/10 ranking/rating against comparable (advertising racing) games on mobile app store and gaming blogs. * 90% favorable mentions and recommendations on social media and blogs. | | | |
| **Assumptions, Risks, Obstacles**   * + - 1. Promotion and advertising for Kaea-Cola Racers will come from customer recommendations, gaming blogs and websites, social networking sites, mobile app store ratings/recommendations       2. There are no copyright, licensing and/or other legal restrictions. We are free to release the game and sell related merchandise       3. Kaea Cola Racers is playable on any smartphone or tablet and is designed for all the major platforms (IOS, Android, Windows etc.)       4. Kaea Cola Racers shall be developed using open source game engines. These game engines offer the ability to build and publish high quality 3D games. See details at <https://blog.liveedu.tv/10-free-game-engines-create-game/>       5. Kaea Cola Racers is available in English and 40 other languages       6. We assume that there is a market for simple-graphics, addictive gameplay games. | | | |
| Prepared by  Group 2 | Date  December 11th, 2018 | Approved by  Susan Gasson | Date  TBD |

# 3. Version Plan

## 3.1 Incremental Version Plan

In this project, we are focusing on developing a racing game that has different levels with various difficulties to make it more challenging. This game will ensure that the player will get all basic features to play the game in version 1. We are planning to develop 4 versions that run on different mobile software such as (IOS-Android-Windows). This game will be updated and improved according to changes and developments on the game requirements.

**Playable Version One:**

Implement basic levels with providing ease in playing the game.

(Single-player and 5 computer players, Simple single loop, power-ups, no obstacles)

**Playable version two:**

Implement and increase the difficulty of the game and adding different features to the game

(New track with additional curves, Three new car designs, Online multiplayer)

**Playable version three:**

Implement and add more new features to the game to make it more fun and attraction.

(Two new tracks - city tracks in this version, Two new car designs, Online multiplayer invites)

**Playable version four:**

Implement more difficulties for the game and add other new features.

(Two new tracks, Two new car designs, Unlockable Achievements, Additional cars)

## 3.2 Version Plan Rationale

Version (1) of the racing game will be developed with all levels in 12-16 months by using certain ways to develop the cycles with its scope, objectives.

**Version scope:** The scope of this version is to develop an easy racing game by providing all the mechanics to implement and release a successful car racing game. These include several stages of the game with different difficulties during the race that allow the player to feel the enjoyment and enthusiasm while playing the game. This game has an attractive set of cars in different colors to symbolize to Kaea-Cola flavors that make the player interested in choosing the favorite flavor.

# 4. Version 1 Cycle Plan

## 4.1 Cycle Plan Rationale

The cycle plan is developed with incremental levels of difficulty. The cycle plan is of 8 levels and each level is designed to enhance the functionality, user interface and overall game platform. It also focuses on game plan that keeps the game player interested by introducing new innovative concepts such as rewards and aims to make the game player enthusiastic.

## 4.2 Cycle Plan

Cycle 1

*Cycle 1 Scope*

The scope of this cycle is to develop the basic model of the car a game player could control with simplest track.

*Cycle 1 Objective*

The goal of this cycle is to familiarize the players by allowing them to control the car in straightway and loop tracks.

*Cycle 1 Feature Sets*

Basic model of the car with basic controls (accelerate, brake, turn); set base stats for cars; basic track (straightaways and loops)

Cycle 2

*Cycle 2 Scope*

The scope of this cycle is to develop computer intelligent cars with different car designs to provide competitive environment for the users.

*Cycle 2 Objective*

The goal of this cycle is to provide the user with challenging and competitive game environment.

*Cycle 2 Feature Sets*

Computer players with basic controls; Race business rules

Cycle 3

*Cycle 3 Scope*

The scope of this cycle is to develop a playable version of the race that is similar in visuals and gameplay to the most basic level of the game.

*Cycle 3 Objective*

The goal of this cycle is to provide the users with better visuals of cars, enhanced visual design of the tracks and definitions during start and finish of the race.

*Cycle 3 Feature Sets*

Basic car skins; Background for track; Start and Finish of the race

Cycle 4

*Cycle 4 Scope*

The scope of this cycle is to prepare upgrades and unlockable content to the users. The rewards are in the form of bottle caps which can be used to unlock content. Also, car sounds such as engine revving up are included.

*Cycle 4 Objective*

The goal of this cycle is to ensure that each user has his own account which facilitates in keeping account of what he/she has won. Also, this cycle aims to provide the game player with basic car sound.

*Cycle 4 Feature Sets*

Inventory and Accounts; Bottlecaps; Car sounds

Cycle 5

*Cycle 5 Scope*

The scope of this cycle is to provide music, sound effects and lighting to upgrade the user interface. The functionality of the car is enhanced by providing powerups to the game players

*Cycle 5 Objective*

The goal of this cycle is to provide better experience to the game player by adding background sounds and lighting.

*Cycle 5 Feature Sets*

Powerups (Nitro) and car upgrades; Background and Effects sound; Lighting

Cycle 6

*Cycle 6 Scope*

The scope of this cycle is to include shopping platform and menus to the game to enable the game player to make in-app purchases.

*Cycle 6 Objective*

The goal of this cycle is to drive the game player’s interest by developing menus and shopping platforms through which they could upgrade the cars, tracks and other features in the game. Also, this cycle focuses on including cameras enhancing the visual component for game players.

*Cycle 6 Feature Sets*

Shop; Menus and Opening Screens; Cameras

Cycle 7

*Cycle 7 Scope*

The scope of this cycle is to incorporate difficulty levels in the game. Also, upgrading option and effects are focused to provide users with multiple options.

*Cycle 7 Objective*

The goal of this cycle is to let the game player continue to play even in upgraded or higher-level modes

*Cycle 7 Feature Sets*

View/Upgrade Mode; Difficulty Levels; Particle Effects

Cycle 8

*Cycle 8 Scope*

The scope of this cycle is to add settings menu to the user interface and have advanced lighting options.

*Cycle 8 Objective*

The goal of this cycle is to provide the user with several options to choose their convenient lighting and environment.

*Cycle 8 Feature Sets*

Advanced Lighting; Settings

# 5. Version 1 Work Breakdown Structure (WBS)

## Cycle 1 Feature Decomposition

### Cycle 1 Feature Sets

Basic model of the car with basic controls (accelerate, brake, turn); set base stats for cars; basic track (straightaways and loops)

### Cycle 1 High-Level Features (Defined as User Stories), with Mid-Level & Low-Level Feature Decomposition

**F1 Feature Set: Basic Car Design and Controls**

F1.1 As a gameplayer, I can see the 3D shape of the body and wheels of the car

F1.2 As a gameplayer, while I am driving the car I can see and experience changes in speed, car tilt, and direction

F1.2.1 As a gameplayer, I can make the car accelerate by pressing and holding the bottom right part of the screen. Gear shifting is not required.

F1.2.2 As a gameplayer, I can make the car brake by pressing and holding the bottom left part of the screen

F1.2.3 As a gameplayer, I can control the direction of the car by tilting the phone to the left or right as though I were holding a steering wheel. I experience that the extent of tilt determines how much the car turns in a particular direction.

F1.2.3.1 User tilts phone left to move car left

F1.2.3.2 User tilts phone right to move car to the right

F2 Feature Set: Basic Performance Stats

F2.1 As a gameplayer, I can experience the car's physics based on the car's performance statistics

F2.1.1 User sees and experiences top speed at 187mph for default car

F2.1.2 User sees and experiences acceleration of 3.50 seconds for default car

F2.1.3 User sees power of 520 HP for default car

F2.1.4 User sees weight of 2,921 Lbs for default car

F2.2 As a gameplayer, I can view the car details in the Car Selection Screen

F3 Feature Set: Basic Track (Straightaways and Curves)

F3.1 As a Track designer, I can create tracks.

F3.1.1 As a track designer, I represent the track by using graphic of 2 parallel lines demarcating the left and right edges of the track on the ground.

F3.1.2 As a track designer, I can build up the track geometry as an array of segments. Each segment has x, y and z co-ordinates that is translated relative to the camera and is projected into the screen.

F3.1.3 As a track designer, to give the illusion of motion – Stripes on the tracks are moved forward by either color cycling or changing the palette every line.

F3.2 As a gameplayer, I can view tracks.

F3.2.1 As a gameplayer, I can view the track as 2 lines demarcating the left and right edges on the ground.

F3.2.2 As a gameplayer, I can travel though the track and experience the movement of the car.

F4 Feature Set: Tracks with Loops

F4.1 As a track designer, I can design tracks with loops by using x, y and z co-ordinates.

F4.2 As a gameplayer, I can play on the tracks with loops.

## Cycle 2 Feature Decomposition

### Cycle 2 Feature Sets

Computer players with basic controls; Race business rules

### Cycle 2 High-Level Features with Mid-Level Feature Decomposition

F5 Feature Set: Computer Players

F5.1 As a computer player, the computer will be controlling up to 5 cars at the same time.

F5.2 As a computer player, the car should stay on the track.

F5.2.1 As a computer player, If the car is not on the track, the car will respawn automatically on the track.

F5.2.2 As a computer player, the car will back to the last position on the track to complete the race.

F5.3 As a computer player, the car on the track will follows the track avoiding other cars and any obstacles.

F5.4 As a computer player, cars should attempt to keep reasonable distances between each other to avoid others cars.

F5.5 As a computer player, when the car needs to do overtake, The AI will allow it to pass one or more cars in front

F5.6 As a computer player, all computer cars have different specifications from each other.

F6 Feature Set: Race Business Rules

F6.1 As a gameplayer, I can see and experience the car respawning when the car goes off track and/or is stuck

F6.1.1 As a gameplayer, I experience a two second delay between when the car stops moving on the track and when the car respawns

F6.1.2 As a gameplayer, I experience the car re-appearing on the track during the respawn process, the same distance from the finish line as where the car left the track or got stuck

F6.1.3 As a gameplayer, I see the car flashing while it respawns

F6.2 As a gameplayer, I can see that every car on the track is different from each other (computer cars have variations in colors)

## Cycle 3 Feature Decomposition

### Cycle 3 Feature Sets

Basic car skins; Background for track; Start and Finish of the race

### Cycle 3 High-Level Features with Mid-Level Feature Decomposition

F7 Feature Set: Car Skins

F7.1 User can see default (unlocked) car which is a cola flavor themed car, in red, white and black colors

F7.2 User can see additional car which is a lime flavor themed car, in green, white and green colors

F8 Feature Set: Background for Track

F8.1 As a track designer, I can create tracks with background.

F8.1.1 As a track designer, I can add sky to the background.

F8.1.2 As a track designer, I can add trees to the background.

F8.1.3 As a track designer, I can add hills to the background.

F8.2 As a gameplayer, I can play on the tracks with background.

F9 Feature Set: Start and Finish of Race

F9.1 As a gameplayer, in Version 1, Select Track/Start Race takes me directly to the track detail screen (for the one available track)

F9.1.1 As a gameplayer, I can see an overhead image of the track

F9.1.2 As a gameplayer, I can see the name of the track

F9.1.3 As a gameplayer, I can see flavor text for the track

F9.1.4 As a gameplayer, I can hear a preview of the background music for the track

F9.1.5 As a gameplayer, I can see a summary of the reward schedule for the track

F9.1.6 As a gameplayer, I can see a Start Race button

F9.1.7 As a gameplayer, I can see a Back button

F9.1.8 As a gameplayer, when I select the Back button, in Version 1, it takes me back to the opening screen

F9.2 As a gameplayer, when I select the Start Race button, the game starts the race mode

F9.2.1 As a gameplayer, when the race mode starts, I can see an animated overview of the track with the track's introductory background music

F9.2.2 As a gameplayer, after the overview, I can see the cars lined up at the starting line

F9.2.3 As a gameplayer, at the starting line, I can see a light that flashes in time with three beeps, two short and one long. The light turns green on the third beep.

F9.2.4 As a gameplayer, when the light turns green, I can see the other cars start to move forward

F9.2.5 As a gameplayer, when the light turns green, I can start to move my car

F9.3 As a gameplayer, when I cross the finish line, the race ends

F9.3.1 As a gameplayer, I observe that the functionality of the controls is disabled after the completion of the race.

F9.3.2 As a gameplayer, I can see the leaderboard popping up after the race is completed, showing the rankings of the different cars.

F9.3.3 As a gameplayer, I can notice that the headlight of the car is turned off automatically once the race is completed.

F9.4 As a gameplayer, if I have not crossed the finish line five in-game minutes after the 5th car to cross the finish line, the race will end automatically.

## Cycle 4 Feature Decomposition

### Cycle 4 Feature Sets

Inventory and Accounts; Bottlecaps; Car sounds

### Cycle 4 High-Level Features with Mid-Level Feature Decomposition

F10 Feature Set: Accounts

F10.1 As a gameplayer, I have an account associated with my deviceID

F10.1.1 As a gameplayer, the first time I open up the game on my device, it registers an account to my deviceID

F10.1.2 As a gameplayer, my account keeps track of what upgrades I have applied to my cars

F10.1.3 As a gameplayer, my account stores how many times I have completed each track

F10.1.4 As a gameplayer, my account stores my scores, ranking, track, and completion time for each performance

F10.1.5 As a gameplayer, my account keeps track of how many soda bottles and bottlecaps I have earned

F10.1.6 As a gameplayer, my account keeps track of how many soda bottles and bottlecaps I have spent and what I have spent them on

F10.1.7 As a gameplayer, my account keeps track of what powerups I have acquired and whether or not they have been spent

F10.1.8 As a gameplayer, my account keeps track of which tracks I have unlocked

F10.1.9 As a gameplayer, my account keeps track of whch cars I have unlocked

F10.1.10 As a gameplayer, my account keeps track of which car is currently selected

F10.2 As a gameplayer, after I unlock a car by completing a level or an achievement, I can see a screen showing me the new car that I have unlocked.

F11 Feature Set: Bottlecaps

F11.1 As a gameplayer, I can see how many bottlecaps I have when I am on the Start Race screen, represented by a graphic and the number of bottlecaps

F11.2 As a gameplayer, when I complete a track I win a preset amount of soda bottles and/or bottlecaps based on my position at the finish line

F11.3 As a track designer, I can set the amount of soda bottles and bottlecaps won for each place on each track

F11.4 As a gameplayer, I can unlock cars and tracks with in-game gems (soda bottles)

F11.5 As a gameplayer, I can unlock upgrades with in-game coins (bottlecaps)

F12 Feature Set: Car Sounds

F12.1 As a gameplayer, I can experience car sounds based on the movement of the car

F12.1.1 As a gameplayer, I can hear and experience the sound chosen for acceleration

F12.1.2 As a gameplayer, I have an option to mute the speakers

F12.1.3 As a gameplayer, I can hear and experience the sound chosen for braking

F12.1.4 As a gameplayer, while driving, I can experience the sound of an engine revving up is turned on.

F12.1.5 As a gameplayer, I can experience the sound chosen for acceleration

F12.1.6 As a gameplayer, while the car is at rest, sound of the engine is turned off.

F12.1.7 As a gameplayer, I can experience the sound chosen when the car spins

F12.1.8 As a gameplayer, I can hear and experience the sound chosen for nitro

F12.1.9 As a gameplayer, I can experience the sound chosen when the car respawns

F12.1.10 As a gameplayer, I can control the volume of the sound using the volume buttons on the mobile device

## Cycle 5 Feature Decomposition

### Cycle 5 Feature Sets

Powerups (Nitro) and car upgrades; Background and Effects sound; Lighting

### Cycle 5 High-Level Features

F13 Feature Set: Power Boosts and Upgrades

F13.1 As a gameplayer, I can fill my nitro meter by driving, and the nitro symbol will flash when the meter is full

F13.2 As a gameplayer, I can pick up powerups that will help me fill my nitro meter faster than normal

F13.3 As a gameplayer, when the nitro symbol flashes, I can activate nitro (boost) by tapping on the nitro symbol on the bottom right part of the screen.

F14 Feature Set: Music

F14.1 As a gameplayer, I can experience background music during the race

F14.2 As a gameplayer, I can experience background music for each menu screen

F15 Feature Set: Lighting

F15.1 As a gameplayer, I see and experience the lighting settings chosen by the track designer

F15.2 As a gameplayer, I see and experience the lighting created by the headlights of my car during the race.

F16 Feature Set: View/Upgrade Mode and Menu

F16.1 As a gameplayer, when there is more than one option that I can choose in the main screen or shops, I will see a horizontal list of buttons. This will be limited to three options per screen, but I can scroll through more buttons if I need to.

F16.2 As a gameplayer, when I enter View/Upgrade mode, I am prompted to select the car that I want to view/upgrade

F16.3 As a gameplayer, in View/Upgrade mode, when I select the car I want to view or upgrade, I see a 3D view of my car and its related statistics

F16.4 As a gameplayer, in View/Upgrade mode I can choose from multiple views of the selected car

F16.5 As a gameplayer, in View/Upgrade mode I can tap on one of the selected car's stats to see more detail about it. When I tap on the stat, the right-hand side of the display changes to show the details for the current stat

F16.6 As a gameplayer, in the stat detail screen of View/Upgrade mode, if I have not already purchased a particular upgrade, I can tap on the upgrade icon to be prompted to purchase it with bottlecaps

F17 Feature Set: Car Selection Menu

F17.1 As a gameplayer, I am prompted to select my car in Upgrade mode and before I start a race.

F17.2 As a gameplayer, I can see my selectable, unlocked car(s) in the car selection menu alongside available cars that I have not yet unlocked

F17.3 As a gameplayer, when I apply upgrades in Upgrade Mode, they will be applied to the car that I have selected

F17.4 As a gameplayer, when I play a race, I will drive the race using the car that I have selected

## Cycle 6 Feature Decomposition

### Cycle 6 Feature Sets

Shop; Menus and Opening Screens; Cameras

### Cycle 6 High-Level Features

F18 Feature Set: Opening Screen

F18.1 As a gameplayer, when I open the game I can choose to play a track, view/upgrade my vehicle(s), or enter the shop

F19 Feature Set: Shop

F19.1 As a gameplayer, when I first enter the shop, I can see three options: Get More Bottles/Bottlecaps; Upgrades and Powerups; and Cars and Tracks

F19.2 As a gameplayer, whenever I am in the shop, I can see the number of soda bottles and bottlecaps I currently have; the number will be displayed in the same relative location on each screen

F19.3 As a gameplayer, if there is no (mobile or wi-fi) network connection, Get More Soda Bottles/Bottlecaps will not be selectable

F19.4 As a gameplayer, when I choose Get More Soda Bottles/Bottlecaps I can see options for multiple different preset packages of soda bottles and bottlecaps

F19.5 As a gameplayer, if there are no additional tracks available in the game (as in Version One), the Tracks button will not be selectable

F19.6 As the game shop manager, I can adjust the upgrades and powerups available in the shop and their prices in bottlecaps for all players

F19.7 As a gameplayer, when I select Upgrades and Powerups from the store I can see various upgrades and powerups available

F19.8 As a gameplayer, I can select an upgrade or powerup from the list by tapping it

F20 Feature Set: Camera

F20.1 As a gameplayer, I see an above-and-behind view of the car during the race

F20.2 As a gameplayer, during the race I experience the camera following my car as it moves around the track

F21 Feature Set: In-Game Menu

F21.1 User can pause/play the game during the race by tapping on the pause/play button on the top middle button on the screen

F21.2 User can select menu at top left part of the screen

F21.3 User can restart the game during the race

F21.4 User can view and adjust game controls in the menu

F21.5 User can see speedometer, current position and lap number at top right part of the screen

F21.6 User can control sound settings in the menu

F21.7 User can control the volume of the sound using the volume buttons on the mobile device

## Cycle 7 Feature Decomposition

### Cycle 7 Feature Sets

View/Upgrade Mode; Difficulty Levels; Particle Effects

### Cycle 7 High-Level Features

F22 Feature Set: Car Upgrades

F22.1 As a gameplayer, I can choose to upgrade my car's appearance and performance

F22.2 As a gameplayer, I can see physical changes in my car in the car selection page and during game play that result from car upgrades I have applied

F22.3 As a gameplayer, I can experience performance changes from upgrades I have made to my car

F23 Feature Set: Difficulty Level

F23.1 As a gameplayer, I can choose the difficulty level of my computer opponents

F24 Feature Set: Particle Effects

F24.1 As a gameplayer, I can see and experience soda coming out of the exhaust when nitro is activated by a car during the race

## Cycle 8 Feature Decomposition

### Cycle 8 Feature Sets

Advanced Lighting; Settings

### Cycle 8 High-Level Feature Sets

F25 Feature Set: Advanced Lighting

F26 Feature Set: Player-Controlled Options and Settings

# 6. Labor and Effort Estimates

We based our labor estimates on a team of seven people: a product manager, game designer, animator/graphic designer, and four developers. We planned the resource usage, duration, and effort for the pre-development tasks and Cycle 1 in detail, and then used that to help create estimates for our feature sets.

## Resource Initials

|  |  |  |  |
| --- | --- | --- | --- |
| PM | Product Manager | D1 | Developer 1 |
| GD | Game Designer | D2 | Developer 2 |
| ANI | Animator/Graphic Designer | D3 | Developer 3 |
|  |  | D4 | Developer 4 |

## Detailed Pre-Development and Cycle 1 Estimates

| Task Name | Task Duration | Resource Initials | Effort Totals | Phase Effort Totals |
| --- | --- | --- | --- | --- |
| **Version 1** |  |  |  |  |
| **Version Requirements** | **30** |  |  | **115** |
| Develop conditions of satisfaction (product goals) | 5 | PM | 5 |  |
| **Define High-level Game Requirements** | **25** |  |  | **110** |
| Define gameplay strategy and controls | 10 | GD,PM | 20 |  |
| Define game development environment requirements | 10 | D1,D2,D3 | 30 |  |
| Define car design requirements | 14 | GD,D1 | 14 |  |
| Define main track and obstacle elements | 5 | GD | 5 |  |
| Produce interface storyboards | 5 | ANI,D4 | 10 |  |
| Produce initial track storyboards | 3 | ANI | 3 |  |
| Produce upgrade roadmap | 3 | GD | 3 |  |
| Produce marketing design requirements | 5 | PM,D2 | 10 |  |
| Define computer player requirements | 5 | D3,D4 | 10 |  |
| Define feature-sets around gameplay objectives | 5 | PM | 5 |  |
| **Version Planning** | **78** |  |  | **148** |
| **Technology acquisition** | **17** |  |  | **24** |
| Evaluate and decide on game engine | 5 | D1,D2,D3 | 15 |  |
| Procure development hardware and software | 3 | PM | 3 |  |
| Install and configure development hardware and software | 4 | D1,D2,D3 | 6 |  |
| **Version Scope** | **78** |  |  | **124** |
| **Plan incremental development strategy** | **45** |  |  | **60** |
| Develop interface layouts | 20 | ANI,GD | 20 |  |
| Develop initial car appearance and design | 15 | D1,ANI,GD | 30 |  |
| Define animation requirements, by feature-set | 5 | PM,ANI | 10 |  |
| **Cycle Planning** | **23** |  |  | **54** |
| Develop feature-set incremental plan | 3 | PM,D1,D2,ANI,GD | 15 |  |
| Assign feature-sets to cycles | 2 | PM,GD,D1,D2 | 8 |  |
| Develop detailed cycle 1 feature-breakdown | 5 | PM,D1,D2 | 15 |  |
| Develop feature-breakdown for cycles 2-4 | 4 | GD,D3 | 8 |  |
| Develop feature-breakdown for cycles 5-7 | 4 | PM,D1 | 6 |  |
| Develop feature-breakdown for cycle 8 | 1 | D2,D3 | 2 |  |
| **Estimation & planning** | **10** |  |  | **10** |
| Produce effort estimate | 2 | PM | 2 |  |
| Produce budget estimate | 5 | PM | 5 |  |
| Agree estimates with client | 2 | PM | 2 |  |
| Project plan signoff | 1 | PM | 1 |  |
| **Cycle 1** | **47** |  |  | **167** |
| **Cycle 1 Planning** | **10** |  |  | **36** |
| Identify Cycle Objectives | 6 | D1,D2,D4,PM,ANI,GD | 24 |  |
| Create next Cycle Plan | 4 | D1,D2,D3,PM,ANI,GD | 12 |  |
| **Cycle 1 Build (Development)** | **31** |  |  | **47** |
| **F1 Feature Set: Basic Car Design and Controls** | **6** |  |  | **18** |
| F1.1 As a gameplayer, I can see the 3D shape of the body and wheels of the car | 5 | D1,ANI | 10 |  |
| **F1.2 As a gameplayer, while I am driving the car I can see and experience changes in speed, car tilt, and direction** | **6** |  |  | **4** |
| F1.2.1 As a gameplayer, I can make the car accelerate by pressing and holding the bottom right part of the screen. Gear shifting is not required. | 2 | D2 | 2 |  |
| F1.2.2 As a gameplayer, I can make the car brake by pressing and holding the bottom left part of the screen | 2 | D3 | 2 |  |
| **F1.2.3 As a gameplayer, I can control the direction of the car by tilting the phone to the left or right as though I were holding a steering wheel**. I experience that the extent of tilt determines how much the car turns in a particular direction. | **4** |  |  | **4** |
| F1.2.3.1 User tilts phone left to turn the car to the left | 4 | D4 | 2 |  |
| F1.2.3.2 User tilts phone right to turn the car to the right | 4 | D4 | 2 |  |
| **F2 Feature Set: Basic Performance Stats** | **11** |  |  | **14** |
| **F2.1 As a gameplayer, I can experience the car's physics based on the car's performance statistics** | **8** |  |  | **8** |
| F2.1.1 User sees and experiences top speed at 187mph for default car | 8 | D4 | 2 |  |
| F2.1.2 User sees and experiences acceleration of 3.50 seconds for default car | 8 | D4 | 2 |  |
| F2.1.3 User sees power of 520 HP for default car | 8 | D4 | 2 |  |
| F2.1.4 User sees weight of 2,921 Lbs for default car | 8 | D4 | 2 |  |
| F2.2 As a gameplayer, I can view the car details in the Car Selection Screen | 3 | D3,ANI | 6 |  |
| **F3 Feature Set: Basic Track (Straightaways and Curves)** | **7** |  |  | **7** |
| **F3.1 As a Track designer, I can create tracks.** | **7** |  |  | **7** |
| F3.1.1 As a track designer, I represent the track by using graphic of 2 parallel lines demarcating the left and right edges of the track on the ground. | 2 | D3 | 2 |  |
| F3.1.2 As a track designer, I can build up the track geometry as an array of segments. Each segment has x, y and z co-ordinates that is translated relative to the camera and is projected into the screen. | 3 | D3 | 3 |  |
| F3.1.3 As a track designer, to give the illusion of motion – Stripes on the tracks are moved forward by either color cycling or changing the palette every line. | 2 | D3 | 2 |  |
| **F4 Feature Set: Tracks with Loops** | **14** |  |  | **8** |
| F4.1 As a track designer, I can design tracks with loops by using x, y and z co-ordinates. | 3 | D3 | 3 |  |
| **F4.2 As a gameplayer, I can play on the tracks with loops.** | **5** |  |  | **5** |
| F4.2.1 As a game player, my car will be assigned a starting point on the track | 2 | D3 | 2 |  |
| F4.2.2 As a gameplayer, I will be able to see my car on the track as I drive on it | 3 | D3 | 3 |  |
| **Cycle 1 Integration and Testing** | **7** |  |  | **35** |
| Integrate all features into working prototype | 4 | D1,D2,D3,D4,GD | 20 |  |
| Test and fix prototype | 3 | D1,D2,D3,D4,GD | 15 |  |
| **Cycle 1 Review** | **7** |  |  | **49** |
| Evaluate prototype with client | 3 | D1,D2,D3,D4,GD,PM,ANI | 21 |  |
| Review feature priorities | 2 | D1,D2,D3,D4,GD,PM,ANI | 14 |  |
| Revisit game/play requirements | 2 | D1,D2,D3,D4,GD,PM,ANI | 14 |  |

### Summary

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Phase** | **Task Duration** | **Effort Totals** | **Phase Totals** | **Notes** |
| **Planning and Pre-Development** | **88** |  | **263** |  |
| **Version Requirements** | **30** | 115 |  |  |
| **Version Planning** | **78** | 148 |  |  |
| **Cycle 1** | **47** |  | **167** |  |
| **Cycle 1 Planning** | **10** | 36 |  | fixed effort |
| **Cycle 1 Build (Development)** | **31** | 47 |  | feature baseline |
| **Cycle 1 Integration and Testing** | **7** | 35 |  | variable based on cycle |
| **Cycle 1 Review** | **7** | 49 |  | fixed effort |
| Total | 102 |  | 430 | (duration is shorter than absolute sum because of partial overlap between Cycle 1 and  Planning & Pre-Development) |

## Story Point Assignment

We used the Cycle 1 effort estimates to help us determine the amount of effort that each subsequent cycle would take. Because the feature sets in some cycles were quite different from one another, we estimated the average feature complexity of the features in the feature set compared to the features in Cycle 1.

We then used the average feature complexity and number of features across all feature sets in a cycle to help us estimate the number of story points assigned to the cycle (and roughly, to the feature set so that we could estimate the feature set effort).

We used the following formula to calculate the story points:

[Average Feature Complexity] \* [Number of Features]  
/ [Cycle1 Story Points] / [Cycle 1 Features] = Story Points

We also assigned extra integration and stagegate effort to Cycles 3, 6, and 8. At the end of each of these cycles, we will have a more in-depth review with the client; these represent major milestones in the look, feel, and gameplay of the game.

| **Cycle** | **Feature Sets** | **# of Features** | **Average Feature Complexity** | **Story  Points** | **Est Feature Effort** | **Extra Integration, Testing, & Stagegate** |
| --- | --- | --- | --- | --- | --- | --- |
| **Cycle 1** | **All Features** | **6** | **100%** | **10** | **47** | **0** |
| **Cycle 2** | **All** | **6** | **90%** | **9** | **44** | **0** |
|  | F5: Computer Players | 4 | 90% | 6 | 29 |  |
|  | F6: Race Business Rules | 2 | 90% | 3 | 15 |  |
| **Cycle 3** | **All** | **8** | **73%** | **10** | **49** | **38** |
|  | F7: Car Skins | 2 | 20% | 0.75 | 4 |  |
|  | F8: Background for Track | 2 | 50% | 1.75 | 9 |  |
|  | F9: Start and Finish of Race | 4 | 110% | 7.5 | 36 |  |
| **Cycle 4** | **All** | **8** | **28%** | **4** | **20** | **0** |
|  | F10: Accounts | 2 | 40% | 1.4 | 7 |  |
|  | F11: Bottlecaps | 5 | 20% | 1.9 | 9 |  |
|  | F12: Car Sounds | 1 | 40% | 0.7 | 4 |  |
| **Cycle 5** | **All** | **17** | **29%** | **9** | **44** | **0** |
|  | F13: Power Boosts and Upgrades | 3 | 85% | 4.4 | 21 |  |
|  | F14: Music | 2 | 20% | .8 | 4 |  |
|  | F15: Lighting | 2 | 20% | .8 | 4 |  |
|  | F16: View/Upgrade Mode and Menu | 6 | 15% | 1.8 | 9 |  |
|  | F17: Car Selection Menu | 4 | 15% | 1.2 | 6 |  |
| **Cycle 6** | **All** | **18** | **30%** | **10** | **48** | **38** |
|  | F18: Opening Screen | 1 | 85% | 1.5 | 7 |  |
|  | F19: Shop | 8 | 30% | 4.4 | 21 |  |
|  | F20: Camera | 2 | 130% | 1.4 | 7 |  |
|  | F21: In-Game Menu | 7 | 60% | 2.7 | 13 |  |
| **Cycle 7** | **All** | **5** | **86%** | **8** | **39** | **0** |
|  | F22: Car Upgrades | 3 | 80% | 4.5 | 22 |  |
|  | F23: Difficulty Level | 1 | 130% | 2.3 | 11 |  |
|  | F24: Particle Effects | 1 | 60% | 1.2 | 6 |  |
| **Cycle 8** | **All** | **8** | **34%** | **5** | **25** | **38** |
|  | F25: Advanced Lighting | 3 | 40% | 2.2 | 11 |  |
|  | F26: Player-Controlled Options and Settings | 5 | 30% | 2.8 | 14 |  |

## Version 1 Labor Estimate (in Person-Days)

For each cycle, we added the feature effort from the above table to the cycle planning, integration testing, and review effort, which we estimate to be approximately the same for each cycle (with additional effort for integration, testing, and stagegate for cycles 3, 6, and 8 as noted above).

| **Cycle** | **Cycle Scope** | **Relative Com-plexity** | **Rationale** | **Feature Effort/ Cycle** | **Total Effort/Cycle** |
| --- | --- | --- | --- | --- | --- |
| **1** | basic car with player controls;  simple track | 10 | baseline | 47 | 167 |
| **2** | develop computer intelligent cars with different car designs to provide competitive environment for the users | 9 | configuring and enforcing AI rules that will affect gameplay | 44 | 164 |
| **3** | playable version of the race that is similar in gameplay to the most basic level of the game | 10 | enhanced visuals; additional time for testing and user acceptance | 49 | 207 |
| **4** | enable upgrades and unlockable features; add car sounds | 4 | relatively simple feature sets; will use stock sound library | 20 | 140 |
| **5** | increase immersion through music, sound effects and lighting; add powerups and upgrades | 9 | powerups and upgrades must be balanced for gameplay | 44 | 164 |
| **6** | create shop and menus; polish visuals through camera control | 10 | new interfaces; additional time for testing and user acceptance | 48 | 206 |
| **7** | apply upgrades to cars; enhanced visuals (particle effects); enhanced AI for difficulty options | 8 | enhancements to rules for AI will be necessary to acommodate difficulty levels | 39 | 159 |
| **8** | additional menu options; advanced lighting | 5 | simpler feature sets as we prepare for final stagegate; additional time for testing and user acceptance | 25 | 183 |

# 7. Project Plan

Our Microsoft Project plan includes detailed estimates for the pre-development and cycle 1 activities, as noted above, and detailed estimates for the post-development stagegate phase, which includes final approval, coordination with marketing prior to launch, and publishing the game. The leveled plan suggests that each cycle should take about 6 weeks including pre- and post-development activities, and we should be able to publish version one about 366 business days from when we start planning (which is about 16.5 months).

In the project plan, we assigned resources for Cycles 2-8 to feature sets rather than to individual development tasks, to reflect the level at which we did our estimation. Some feature sets only required the work of one or two specific resources, so we felt that this was more accurate than simply assigning all resources to the cycle development as a whole, and it helped us more accurately target our effort estimate totals. In some cases, however, development effort in the project plan may be a couple of days longer than the effort in the estimates, due to the multipliers involved.

# 8. Executive Summary

We feel that the proposed racing game would be a good fit for Kaea-Cola. It should increase our visibility and goodwill among consumers, and will have more engagement than a traditional advertising campaign, especially with the possibility for additional marketing tie-ins. In addition, unlike a traditional advertising campaign, it will earn back some of its costs by allowing us to make revenue from ad views and in-game purchases.

We feel that a more detailed financial analysis is called for to help us identify the costs relative to a more traditional ad campaign and to also help us better identify what our targets should be for ad views and in-game purchases in order for it to be cost-competitive. If these numbers are realistic, then we would recommend proceeding with development.

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# Appendix A: Project Tasks and Duration

| **Task Name** | **Duration** | **Resource Initials** | **Effort** | **Phase Totals** |
| --- | --- | --- | --- | --- |
| **Version 1** | **356 days** |  |  | **1733 days** |
| **Version Requirements** | **30 days** |  |  | **115 days** |
| Develop conditions of satisfaction (product goals) | 5 days | PM | 5 days |  |
| **Define High-level Game Requirements** | **25 days** |  |  | **110 days** |
| Define gameplay strategy and controls | 10 days | GD,PM | 20 days |  |
| Define game development environment requirements | 10 days | D1,D2,D3 | 30 days |  |
| Define car design requirements | 14 days | GD,D1 | 14 days |  |
| Define main track and obstacle elements | 5 days | GD | 5 days |  |
| Produce interface storyboards | 5 days | ANI,D4 | 10 days |  |
| Produce initial track storyboards | 3 days | ANI | 3 days |  |
| Produce upgrade roadmap | 3 days | GD | 3 days |  |
| Produce marketing design requirements | 5 days | PM,D2 | 10 days |  |
| Define computer player requirements | 5 days | D3,D4 | 10 days |  |
| Define feature-sets around gameplay objectives | 5 days | PM | 5 days |  |
| **Version Planning** | **78 days** |  |  | **148 days** |
| **Technology acquisition** | **17 days** |  |  | **24 days** |
| Evaluate and decide on game engine | 5 days | D1,D2,D3 | 15 days |  |
| Procure development hardware and software | 3 days | PM | 3 days |  |
| Install and configure development hardware and software | 4 days | D1,D2,D3 | 6 days |  |
| **Version Scope** | **78 days** |  |  | **124 days** |
| **Plan incremental development strategy** | **45 days** |  |  | **60 days** |
| Develop interface layouts | 20 days | ANI,GD | 20 days |  |
| Develop initial car appearance and design | 15 days | D1,ANI,GD | 30 days |  |
| Define animation requirements, by feature-set | 5 days | PM,ANI | 10 days |  |
| **Cycle Planning** | **23 days** |  |  | **54 days** |
| Develop feature-set incremental plan | 3 days | PM,D1,D2,ANI,GD | 15 days |  |
| Assign feature-sets to cycles | 2 days | PM,GD,D1,D2 | 8 days |  |
| Develop detailed cycle 1 feature-breakdown | 5 days | PM,D1,D2 | 15 days |  |
| Develop feature-breakdown for cycles 2-4 | 4 days | GD,D3 | 8 days |  |
| Develop feature-breakdown for cycles 5-7 | 4 days | PM,D1 | 6 days |  |
| Develop feature-breakdown for cycle 8 | 1 day | D2,D3 | 2 days |  |
| **Estimation & planning** | **10 days** |  |  | **10 days** |
| Produce effort estimate | 2 days | PM | 2 days |  |
| Produce budget estimate | 5 days | PM | 5 days |  |
| Agree estimates with client | 2 days | PM | 2 days |  |
| Project plan signoff | 1 day | PM | 1 day |  |
| **Cycle 1** | **47 days** |  |  | **167 days** |
| **Cycle 1 Planning** | **10 days** |  |  | **36 days** |
| Identify Cycle Objectives | 6 days | D1,D2,D4,PM,ANI,GD | 24 days |  |
| Create next Cycle Plan | 4 days | D1,D2,D3,PM,ANI,GD | 12 days |  |
| **Cycle 1 Build (Development)** | **31 days** |  |  | **47 days** |
| **F1 Feature Set: Basic Car Design and Controls** | **6 days** |  |  | **18 days** |
| F1.1 As a gameplayer, I can see the 3D shape of the body and wheels of the car | 5 days | D1,ANI | 10 days |  |
| **F1.2 As a gameplayer, while I am driving the car I can see and experience changes in speed, car tilt, and direction** | **6 days** |  |  | **4 days** |
| F1.2.1 As a gameplayer, I can make the car accelerate by pressing and holding the bottom right part of the screen. Gear shifting is not required. | 2 days | D2 | 2 days |  |
| F1.2.2 As a gameplayer, I can make the car brake by pressing and holding the bottom left part of the screen | 2 days | D3 | 2 days |  |
| **F1.2.3 As a gameplayer, I can control the direction of the car by tilting the phone to the left or right as though I were holding a steering wheel. I experience that the extent of tilt determines how much the car turns in a particular direction.** | **4 days** |  |  | **4 days** |
| F1.2.3.1 User tilts phone left to turn the car to the left | 4 days | D4 | 2 days |  |
| F1.2.3.2 User tilts phone right to turn the car to the right | 4 days | D4 | 2 days |  |
| **F2 Feature Set: Basic Performance Stats** | **11 days** |  |  | **14 days** |
| **F2.1 As a gameplayer, I can experience the car's physics based on the car's performance statistics** | **8 days** |  |  | **8 days** |
| F2.1.1 User sees and experiences top speed at 187mph for default car | 8 days | D4 | 2 days |  |
| F2.1.2 User sees and experiences acceleration of 3.50 seconds for default car | 8 days | D4 | 2 days |  |
| F2.1.3 User sees power of 520 HP for default car | 8 days | D4 | 2 days |  |
| F2.1.4 User sees weight of 2,921 Lbs for default car | 8 days | D4 | 2 days |  |
| F2.2 As a gameplayer, I can view the car details in the Car Selection Screen | 3 days | D3,ANI | 6 days |  |
| **F3 Feature Set: Basic Track (Straightaways and Curves)** | **7 days** |  |  | **7 days** |
| **F3.1 As a Track designer, I can create tracks.** | **7 days** |  |  | **7 days** |
| F3.1.1 As a track designer, I represent the track by using graphic of 2 parallel lines demarcating the left and right edges of the track on the ground. | 2 days | D3 | 2 days |  |
| F3.1.2 As a track designer, I can build up the track geometry as an array of segments. Each segment has x, y and z co-ordinates that is translated relative to the camera and is projected into the screen. | 3 days | D3 | 3 days |  |
| F3.1.3 As a track designer, to give the illusion of motion – Stripes on the tracks are moved forward by either color cycling or changing the palette every line. | 2 days | D3 | 2 days |  |
| **F4 Feature Set: Tracks with Loops** | **14 days** |  |  | **8 days** |
| F4.1 As a track designer, I can design tracks with loops by using x, y and z co-ordinates. | 3 days | D3 | 3 days |  |
| **F4.2 As a gameplayer, I can play on the tracks with loops.** | **5 days** |  |  | **5 days** |
| F4.2.1 As a game player, my car will be assigned a starting point on the track | 2 days | D3 | 2 days |  |
| F4.2.2 As a gameplayer, I will be able to see my car on the track as I drive on it | 3 days | D3 | 3 days |  |
| **Cycle 1 Integration and Testing** | **7 days** |  |  | **35 days** |
| Integrate all features into working prototype | 4 days | D1,D2,D3,D4,GD | 20 days |  |
| Test and fix prototype | 3 days | D1,D2,D3,D4,GD | 15 days |  |
| **Cycle 1 Review** | **7 days** |  |  | **49 days** |
| Evaluate prototype with client | 3 days | D1,D2,D3,D4,GD,PM,ANI | 21 days |  |
| Review feature priorities | 2 days | D1,D2,D3,D4,GD,PM,ANI | 14 days |  |
| Revisit game/play requirements | 2 days | D1,D2,D3,D4,GD,PM,ANI | 14 days |  |
| **Cycle 2** | **31 days** |  |  | **170 days** |
| **Cycle 2 Planning** | **6 days** |  |  | **42 days** |
| Identify Cycle Objectives | 4 days | D1,D2,D3,PM,ANI,GD,D4 | 28 days |  |
| Create next Cycle Plan | 2 days | D1,D2,D3,PM,ANI,GD,D4 | 14 days |  |
| **Cycle 2 Build (Development)** | **11 days** |  |  | **44 days** |
| F5 Feature Set: Computer Players | 7 days | D1,D2,D3,D4 | 28 days |  |
| F6 Feature Set: Race Business Rules | 4 days | D1,D2,D3,D4 | 16 days |  |
| **Integration and Testing** | **7 days** |  |  | **35 days** |
| Integrate all features into working prototype | 4 days | D1,D2,D3,D4,GD | 20 days |  |
| Test and fix prototype | 3 days | D1,D2,D3,D4,GD | 15 days |  |
| **Cycle Review** | **7 days** |  |  | **49 days** |
| Evaluate prototype with client | 3 days | D1,D2,D3,D4,GD,PM,ANI | 21 days |  |
| Review feature priorities | 2 days | D1,D2,D3,D4,GD,PM,ANI | 14 days |  |
| Revisit game/play requirements | 2 days | D1,D2,D3,D4,GD,PM,ANI | 14 days |  |
| **Cycle 3** | **41 days** |  |  | **208 days** |
| **Cycle 3 Planning** | **6 days** |  |  | **36 days** |
| Identify Cycle Objectives | 4 days | D1,D2,D3,PM,ANI,GD | 24 days |  |
| Create Next Cycle Plan | 2 days | D1,D2,D3,PM,ANI,GD | 12 days |  |
| **Cycle 3 Build (Development)** | **15 days** |  |  | **50 days** |
| F7 Feature Set: Car Skins | 4 days | D4,ANI,PM | 6 days |  |
| F8 Feature Set: Background for Track | 8 days | D1,ANI | 8 days |  |
| F9 Feature Set: Start and Finish of Race | 9 days | ANI,D2,D3,GD | 36 days |  |
| **Integration and Testing** | **9 days** |  |  | **45 days** |
| Integrate all features into working prototype | 5 days | D1,D2,D3,D4,GD | 25 days |  |
| Test and fix prototype | 4 days | D1,D2,D3,D4,GD | 20 days |  |
| **Cycle Review** | **11 days** |  |  | **77 days** |
| Evaluate prototype with client | 5 days | D1,D2,D3,D4,GD,PM,ANI | 35 days |  |
| Review feature priorities | 3 days | D1,D2,D3,D4,GD,PM,ANI | 21 days |  |
| Revisit game/play requirements | 3 days | D1,D2,D3,D4,GD,PM,ANI | 21 days |  |
| **Cycle 4** | **24 days** |  |  | **141 days** |
| **Cycle 4 Planning** | **6 days** |  |  | **36 days** |
| Identify Cycle Objectives | 4 days | D1,D2,D3,PM,ANI,GD | 24 days |  |
| Create Next Cycle Plan | 2 days | D1,D2,D3,PM,ANI,GD | 12 days |  |
| **Cycle 4 Build (Development)** | **4 days** |  |  | **21 days** |
| F10 Feature Set: Accounts | 4 days | D2,D3 | 8 days |  |
| F11 Feature Set: Bottlecaps | 3 days | D1,D4,ANI | 9 days |  |
| F12 Feature Set: Car Sounds | 2 days | GD,PM | 4 days |  |
| **Integration and Testing** | **7 days** |  |  | **35 days** |
| Integrate all features into working prototype | 4 days | D1,D2,D3,D4,GD | 20 days |  |
| Test and fix prototype | 3 days | D1,D2,D3,D4,GD | 15 days |  |
| **Cycle Review** | **7 days** |  |  | **49 days** |
| Evaluate prototype with client | 3 days | D1,D2,D3,D4,GD,PM,ANI | 21 days |  |
| Review feature priorities | 2 days | D1,D2,D3,D4,GD,PM,ANI | 14 days |  |
| Revisit game/play requirements | 2 days | D1,D2,D3,D4,GD,PM,ANI | 14 days |  |
| **Cycle 5** | **37 days** |  |  | **164 days** |
| **Cycle 5 Planning** | **6 days** |  |  | **36 days** |
| Identify Cycle Objectives | 4 days | D1,D2,D3,PM,ANI,GD | 24 days |  |
| Create Next Cycle Plan | 2 days | D1,D2,D3,PM,ANI,GD | 12 days |  |
| **Cycle 5 Build (Development)** | **17 days** |  |  | **44 days** |
| F13 Feature Set: Power Boosts and Upgrades | 7 days | ANI,GD,D1 | 21 days |  |
| F14 Feature Set: Music | 4 days | PM | 4 days |  |
| F15 Feature Set: Lighting | 4 days | ANI | 4 days |  |
| F16 Feature Set: View/Upgrade Mode and Menu | 6 days | ANI,D3,D4 | 9 days |  |
| F17 Feature Set: Car Selection Menu | 6 days | ANI,D2 | 6 days |  |
| **Integration and Testing** | **7 days** |  |  | **35 days** |
| Integrate all features into working prototype | 4 days | D1,D2,D3,D4,GD | 20 days |  |
| Test and fix prototype | 3 days | D1,D2,D3,D4,GD | 15 days |  |
| **Cycle Review** | **7 days** |  |  | **49 days** |
| Evaluate prototype with client | 3 days | D1,D2,D3,D4,GD,PM,ANI | 21 days |  |
| Review feature priorities | 2 days | D1,D2,D3,D4,GD,PM,ANI | 14 days |  |
| Revisit game/play requirements | 2 days | D1,D2,D3,D4,GD,PM,ANI | 14 days |  |
| **Cycle 6** | **36 days** |  |  | **206 days** |
| **Cycle 6 Planning** | **6 days** |  |  | **36 days** |
| Identify Cycle Objectives | 4 days | D1,D2,D3,PM,ANI,GD | 24 days |  |
| Create Next Cycle Plan | 2 days | D1,D2,D3,PM,ANI,GD | 12 days |  |
| **Cycle 6 Build (Development)** | **10 days** |  |  | **48 days** |
| F18 Feature Set: Opening Screen | 4 days | ANI,D1 | 8 days |  |
| F19 Feature Set: Shop | 10 days | D2,PM | 20 days |  |
| F20 Feature Set: Camera | 8 days | ANI,GD | 8 days |  |
| F21 Feature Set: In-Game Menu | 6 days | D3,D4 | 12 days |  |
| **Integration and Testing** | **9 days** |  |  | **45 days** |
| Integrate all features into working prototype | 5 days | D1,D2,D3,D4,GD | 25 days |  |
| Test and fix prototype | 4 days | D1,D2,D3,D4,GD | 20 days |  |
| **Cycle Review** | **11 days** |  |  | **77 days** |
| Evaluate prototype with client | 5 days | D1,D2,D3,D4,GD,PM,ANI | 35 days |  |
| Review feature priorities | 3 days | D1,D2,D3,D4,GD,PM,ANI | 21 days |  |
| Revisit game/play requirements | 3 days | D1,D2,D3,D4,GD,PM,ANI | 21 days |  |
| **Cycle 7** | **29 days** |  |  | **159 days** |
| **Cycle 7 Planning** | **6 days** |  |  | **36 days** |
| Identify Cycle Objectives | 4 days | D1,D2,D3,PM,ANI,GD | 24 days |  |
| Create Next Cycle Plan | 2 days | D1,D2,D3,PM,ANI,GD | 12 days |  |
| **Cycle 7 Build (Development)** | **9 days** |  |  | **39 days** |
| F22 Feature Set: Car Upgrades | 7 days | ANI,PM,D1 | 21 days |  |
| F23 Feature Set: Difficulty Level | 6 days | D2,GD | 12 days |  |
| F24 Feature Set: Particle Effects | 4 days | ANI,D4,D3 | 6 days |  |
| **Integration and Testing** | **7 days** |  |  | **35 days** |
| Integrate all features into working prototype | 4 days | D1,D2,D3,D4,GD | 20 days |  |
| Test and fix prototype | 3 days | D1,D2,D3,D4,GD | 15 days |  |
| **Cycle Review** | **7 days** |  |  | **49 days** |
| Evaluate prototype with client | 3 days | D1,D2,D3,D4,GD,PM,ANI | 21 days |  |
| Review feature priorities | 2 days | D1,D2,D3,D4,GD,PM,ANI | 14 days |  |
| Revisit game/play requirements | 2 days | D1,D2,D3,D4,GD,PM,ANI | 14 days |  |
| **Cycle 8** | **32 days** |  |  | **198 days** |
| **Cycle 8 Planning** | **8 days** |  |  | **48 days** |
| Identify Cycle Objectives | 4 days | D1,D2,D3,PM,ANI,GD | 24 days |  |
| Create a Sketch of the Next Version Plan | 4 days | D1,D2,D3,PM,ANI,GD | 24 days |  |
| **Cycle 8 Build (Development)** | **4 days** |  |  | **28 days** |
| F25 Feature Set: Advanced Lighting | 4 days | D1,D2,ANI | 12 days |  |
| F26 Feature Set: Player-Controlled Options and Settings | 4 days | D3,D4,PM,GD | 16 days |  |
| **Integration and Testing** | **9 days** |  |  | **45 days** |
| Integrate all features into working prototype | 5 days | D1,D2,D3,D4,GD | 25 days |  |
| Test and fix prototype | 4 days | D1,D2,D3,D4,GD | 20 days |  |
| **Cycle Review** | **11 days** |  |  | **77 days** |
| Evaluate prototype with client | 5 days | D1,D2,D3,D4,GD,PM,ANI | 35 days |  |
| Review feature priorities | 3 days | D1,D2,D3,D4,GD,PM,ANI | 21 days |  |
| Revisit game/play requirements | 3 days | D1,D2,D3,D4,GD,PM,ANI | 21 days |  |
| **Version Review (Stagegate)** | **11 days** |  |  | **37 days** |
| Stagegate review for the final system | 5 days | PM,GD | 10 days |  |
| Remediation of client issues | 3 days | D1,D2,D3,ANI,GD,D4,PM | 21 days |  |
| Client approval and signoff for final system | 3 days | PM,GD | 6 days |  |
| **Publication and Version Closure** | **13 days** |  |  | **20 days** |
| Procurement close | 5 days | GD | 5 days |  |
| Work with marketing to plan launch | 5 days | PM | 5 days |  |
| Obtain formal acceptance | 2 days | PM | 2 days |  |
| Publish game on app stores | 8 days | GD | 8 days |  |
| Version 1 Closure Milestone | 0 days |  | 0 days |  |