
# Final Release:

# Aquario Kart: Double Splash!!

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## Game Summary

Aquario Kart: Double Splash!! is a water-themed combat racing game, in which the player can use various items to try and gain an advantage over their AI opponents in order to secure their victory.

Races function similarly to how they do in most kart racing games: Participants start grouped up behind a starting line and after a short countdown attempt to be the first to complete a set amount of laps on the given race track. Item boxes are strewn about the course, that grant vehicles passing through them a semi-random, single-use item. In our game most items have a primary and secondary use that the player can choose from, descriptions for the items in our game can be found in the alpha release report.

The key differentiating factor to our game is its water system: Each vehicle is equipped with a water tank, where stored water is used to increase the vehicle's top speed and allow it to use items. Water is gained by driving through water (puddles, lakes or rivers) or by discarding unwanted or unusable items. Many items leave temporary puddles behind, as does the act of discarding an item, giving racers further back more opportunities to fill up their own tank, thereby allowing them to drive faster and use more items.

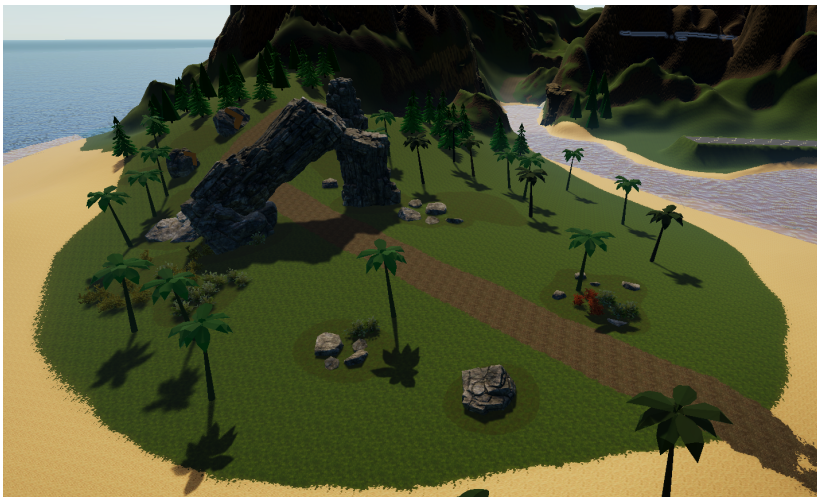
However while driving through puddles to gain water is beneficial in the sense that it refills a vehicle's water tank, puddles also negatively affect a vehicle's handling, as puddles are slippery. This isn't the only element that can modify vehicle parameters, boost items and boost pads will raise top speed and engine power, whereas driving through rivers or away from the race course will significantly increase drag, slowing the car down. Some of these effects can be reduced by drifting, which also conserves water.

Mastering these elements, the player attempts to outplay their AI competition and be the first to pass the finish line.

## Changes since Alpha Release

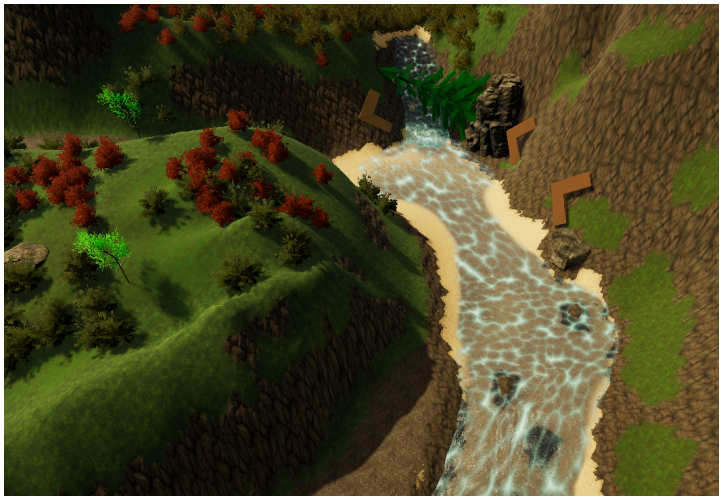
The main changes since the Alpha Release are related to our race course. The Track has received additional scenery that should make it more interesting to look at and also help guide the player along the track.

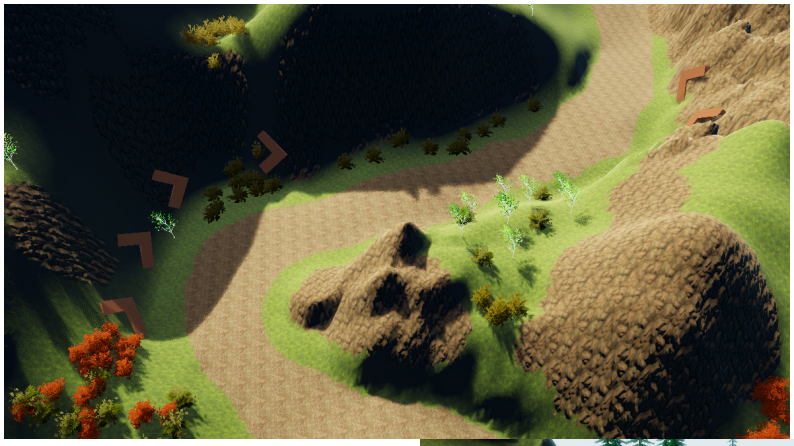
For example at this point of the track where the player is supposed to turn off the road and onto the dirt track, additional barriers were added that conform more to the shape of the curve and feature lights that flash in a right-to-left pattern towards the direction the track continues along.



This previously empty beach section has received a new landmark in the form of a rock arch to drive under. Various trees, bushes and other rocks were also added to make the section more visually appealing.

At this section where the track continues up a river, a fallen tree was added over the waterfall in addition to some wooden arrows to try to prevent players from thinking they need to drive up the waterfall and guide them to the left where the track continues.





The arrows make another appearance in the following set of tight curves directly after the river section.

The road section following the jump off the broken bridge has received additional terrain detail, trees, bushes and rocks, to give it a more natural and finished look.

Following the road section mentioned above, the turn off onto another dirt road is now highlighted by rocks with arrows pointing towards the dirt road. The tree blocking the paved road was scaled up and large rocks obscuring the player's view of how this road continues.

To reduce the amount of noticeable pop-in, additional tree LODs were added and the range at which trees are visible in some form was increased, though trees at medium to long range are now of much lower quality. We also enabled LOD fading, which makes LOD switches of both trees and bushes a lot less noticeable. To further improve the performance of our game we also reduced the amount of trees and bushes in locations where the player can hardly see them.

Various issues with the baked lighting were fixed. Previously many objects such as most houses displayed baked global illumination incorrectly or not at all. The benefits of having working GI should be fairly noticeable in the before-and-after comparison below:

Our AI has received a very simple form of rubber banding to try to prevent cases where it gains too much of a lead over a human player. Essentially AI vehicles ahead of the player gradually have their top speed limited the further they are ahead, preventing cases where it is quite literally impossible for the player to catch up and make use of the puddles left behind by AI vehicles further forward.

For the creation of our trailer, we added a free-camera feature as well as some cheats that allow us to refill a vehicle's water tank, give it a specific item or reroll the vehicle's color. The camera can be attached to one vehicle while following the movements of another to create some interesting shots of our game. It should however be noted that the trailer was recorded before many of the changes to the track mentioned above were added, so what is shown in the trailer and screenshots below isn't entirely up to date.

Finally compatibility with the Nintendo Switch Pro Controller was improved in menus, because for whatever reason unity's predefined "submit" and "cancel" UI actions weren't mapped to any buttons on this controller.

## Screenshots


AQUARIOKART
DOUBLE SPLASH!!
PLAY
HELP
SETTINGS
EXIT


8th
06:52.435
MENU
RESTART


LAP
2/3
15th
POS
ITEM
WATER


LAP
1/3
25th
POS
ITEM
WATER


LAP
2/3
12th
POS
ITEM
WATER

## Our Experience

Overall we were able to realise our initial idea without needing to make changes that would stand out during gameplay. The main changes between what was pitched in our initial presentation and the final game relate to the capabilities of the AI. Our current system doesn't support branching paths/shortcuts, and the AI has relatively little awareness of its surrounding environment, focusing more on just following the track. As it turned out making the AI more complex wasn't needed for it to offer a significant challenge. That isn't to say there isn't room for improvement to make the AI's actions look a bit more natural in certain scenarios, just that these changes wouldn't have made enough of a difference to the untrained eye to be worth investing time in.

As for the development schedule, we didn't really make use of it after its creation, but most of the major aspects of the game were completed for the milestones listed in the schedule. It's hard to say how well the estimated time cost for implementing the various game elements lined up with the actual amount of time used, as this wasn't something we were actively measuring.

## Personal Comments

**1. What was the biggest technical difficulty during the project?**

The AI took a while to get to the point where it could perform adequately in most situations. Part of the problem was that the AI and vehicle handling are tightly related, but were at least initially developed by different people, so the AI was initially not making good use of the data given by the vehicle (e.g. using the current maximum wheel steering angle to determine the amount of steering input needed to steer towards a target). Initially the AI could also only look ahead towards the next checkpoint for its steering target, meaning that it had little information to go off of whenever it got close to a checkpoint. This was later changed to a system where the AI can look ahead on the track by an arbitrary (and currently speed dependent) distance.

**2. What was your impression of working with the theme?**

Given the type of game we made, the theme didn't limit us all that much, so it was pretty easy to work with.

**3. Do you think the theme enhanced your game, or would you have been happier with total freedom?**

The theme definitely helped give us the idea for how to make our game stand out in its genre, and didn't really limit us beyond that.

**4. What would you do differently in your next game project?**

Use a different Terrain system.

**5. Do you consider the project a success?**

Absolutely.

**6. To what extent did you meet your project plan and milestones (not at all, partly, mostly, always)?**

While some points weren't met exactly, we pretty much achieved what we had envisioned for our Desired Target (and everything below that). The main omission is that our game doesn't have sound, but doing sound properly would have taken up time that was needed elsewhere. On the plus side we were able to include the attractive menus listed in our High Target. Most of the other elements listed in the high target and extras would have been unreasonable to add in the given time frame without making significant sacrifices elsewhere.

**7. What improvements would you suggest for the course organization?**

Having the prototype stage after the pitch for the game idea, and forcing a specific type of prototype that might not make sense for every project didn't make a whole lot of sense and was mostly a waste of time.

**8. Do you feel there wasn't enough time or that the schedule was too compressed?**

There's never enough time.

On a more serious note though, from what I remember the course took place entirely (or at least almost entirely) before the exam period, whereas this semester starting around halfway through the playtesting phase there was some overlap. With the time extension for the final release by almost two weeks this wasn't as much of a problem as it could have been, and I suspect all this had a lot to do with the late start of the semester in November, but in any case the original time plan wasn't ideal because of all this.