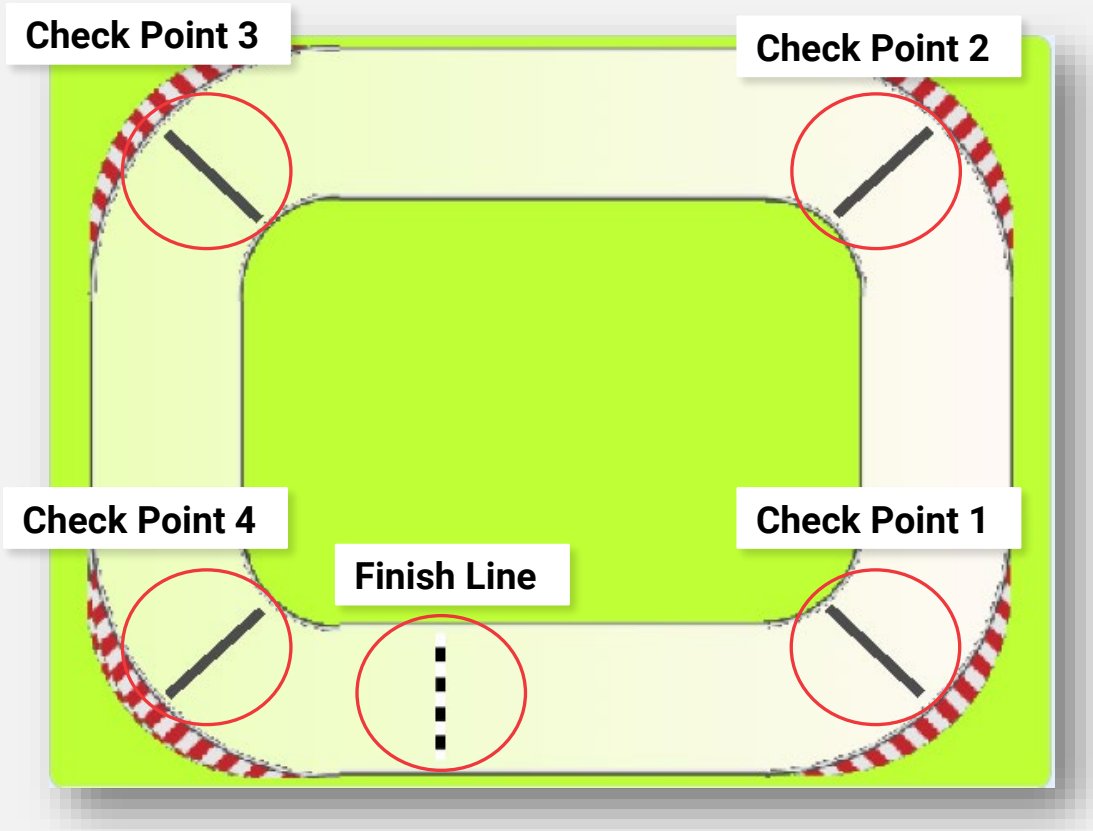
Scratch Programming

Lesson 2-7

Car Race Game III

Presented by Advaspire Team

Review - Check Points setup

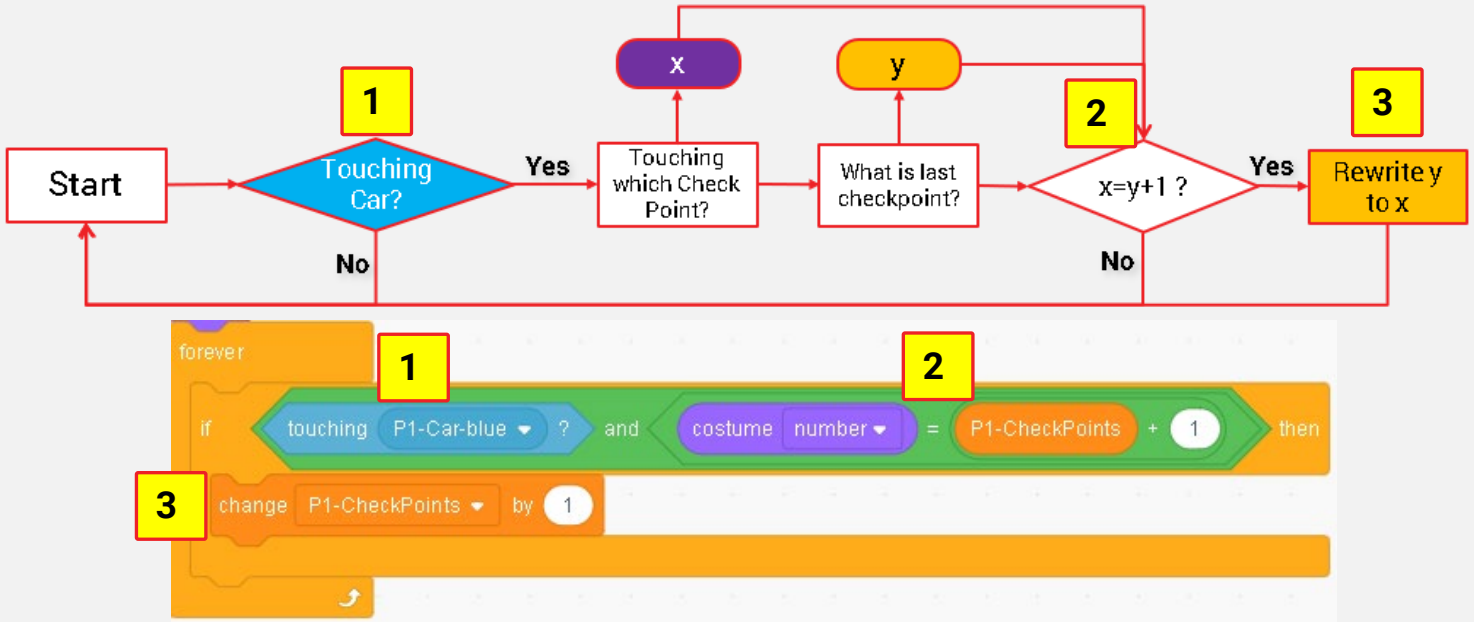


Inside the "Check point" Sprite, I have 5 costumes including 1 finish line & 4 check points (same color as road track).

Then I use clone function to clone them to different corners on the track. (As the color is same as road track, so I have hidden the car and road track as shown at the left).

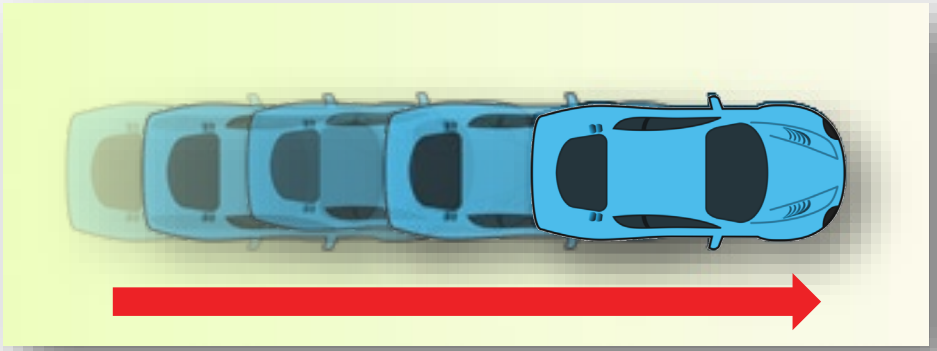
The purpose of setting up these checkpoints is to make sure the car follow track and don't use shortcut.

Review – Script with more effective way



And actually we can simplify the equation to be like above structure.

Review - Add Some Physics



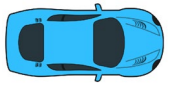
In real world, our car has acceleration.

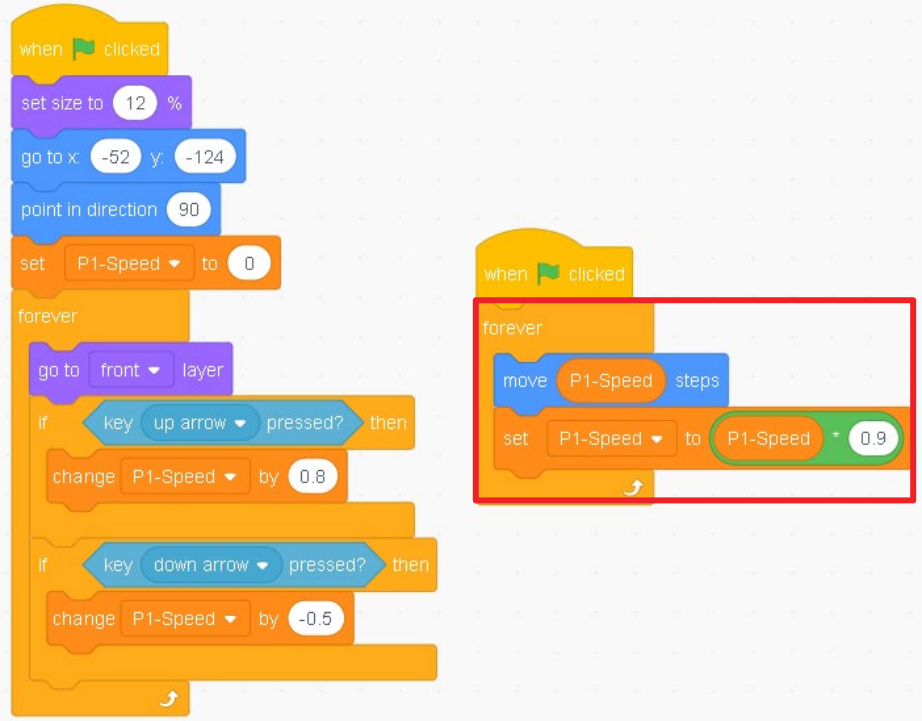
***Acceleration means the increase of speed.**

But we don't have acceleration for our car now. So when we press up, it will move based on the number we put in move __ steps.

Review – Advance Motion Control

Script:





Therefore, we will make the value of P1-Speed keeps depleting (10%) in every loop until it reaches zero.

In very slow motion, when your P1-Speed is at 10 initially, then you release the <up> button, it will go:

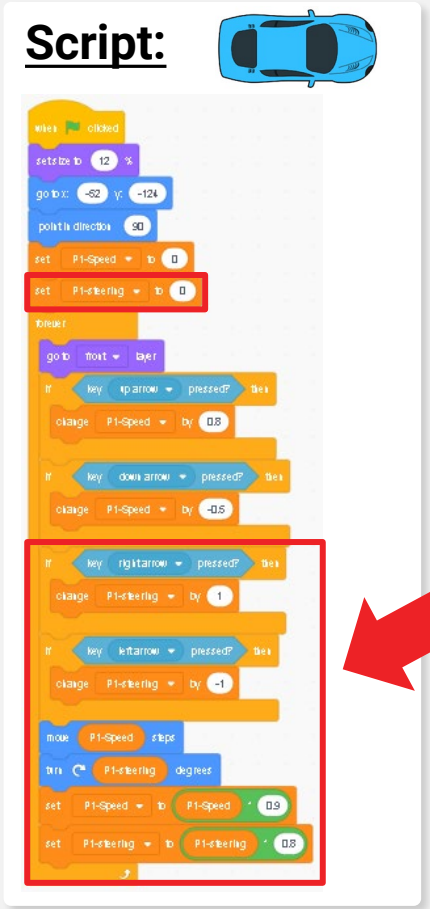
1st loop: become 9 (-10% from 10)
2nd loop: become 8.1 (-10% from 9)
3rd loop: become 7.29 (-10% from 8.1)
4th loop: become 6.56 (-10% from 7.29)

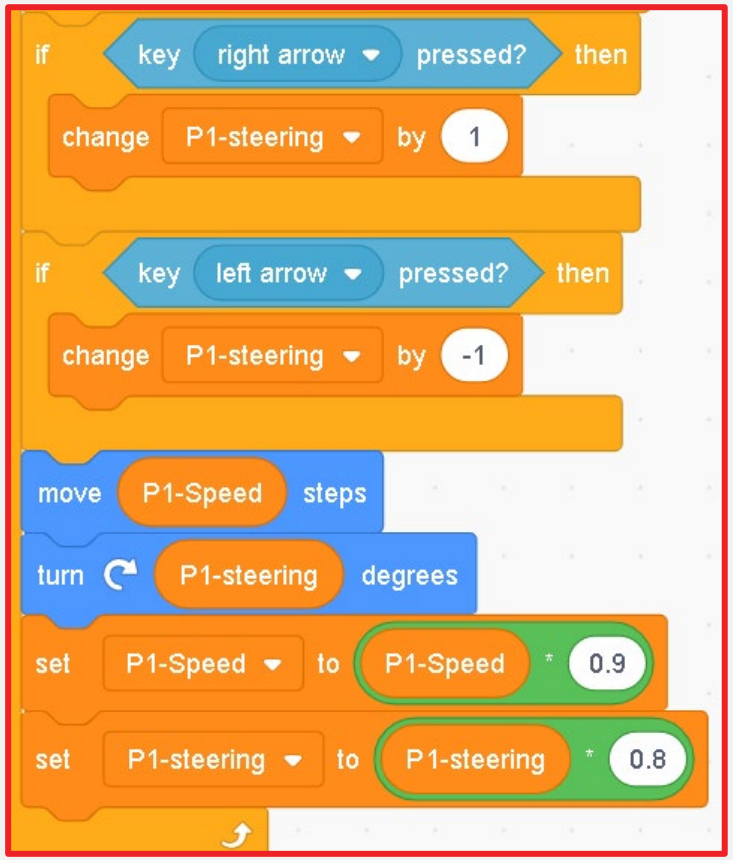
↓

nth loop: until reaches 0

Review – Same for Turning

Script:



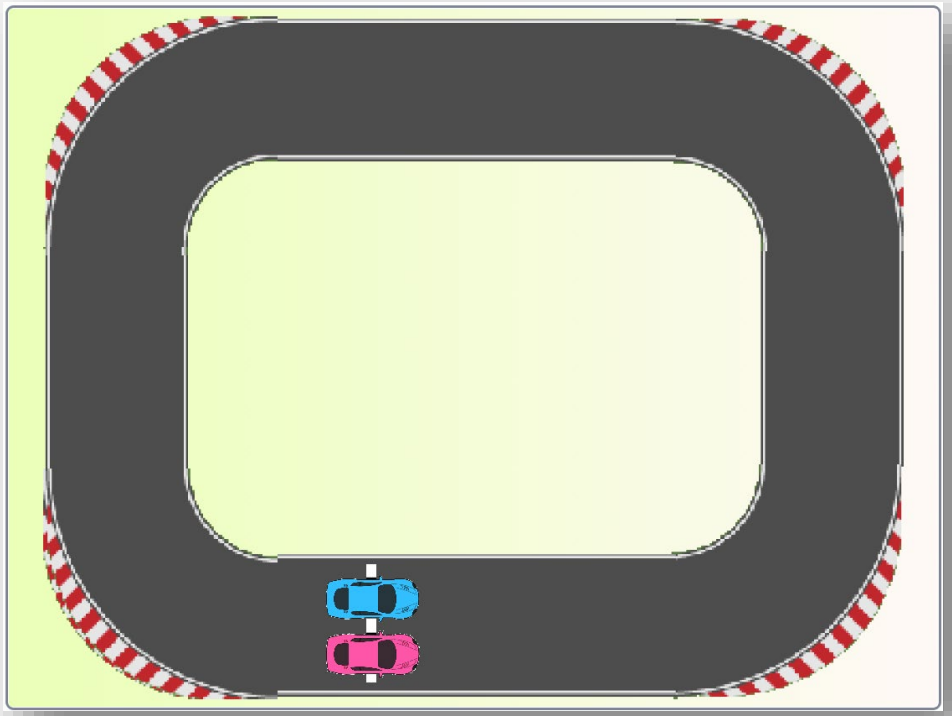


I will add a variable call steering to turn the car.

As we only increase or decrease the value of steering, we will only use "turn clockwise for __ degrees".

In future we will often use value to determine direction (negative means opposite direction).

Mission 2-6 – Car Race Game



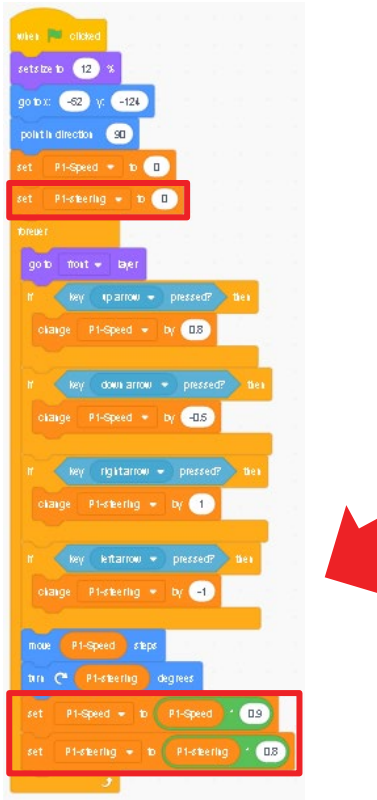
We don't want the car to restart to the starting position when moving off-track. Instead, I want the car to move slower when it moving on off-track.

And when it move back to the track, the speed will become normal again.

Please also prepare different maps (at least 3 maps) for next lesson.

Make Car run slower when it's off-track

Script:

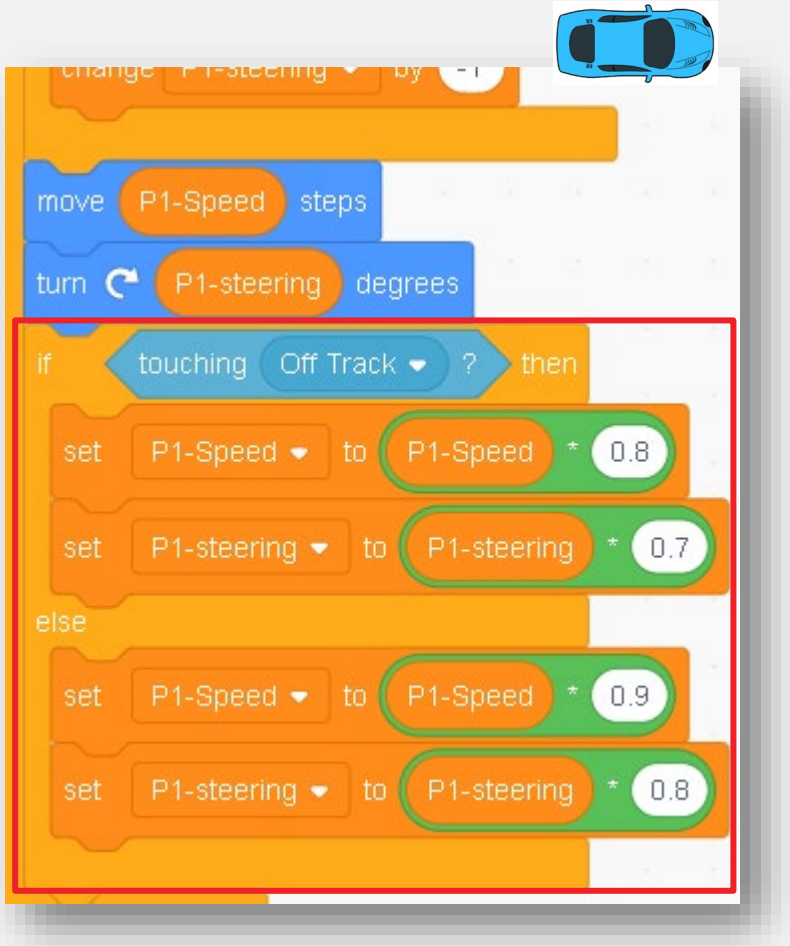


This part is actually similar concept of friction.

The more it deplete for each loop, the higher the friction it is.

So if it deplete for 20% for each loop, the friction will be higher than 10% as in this case, so the car running with 20% friction will stop earlier than it's on 10%.

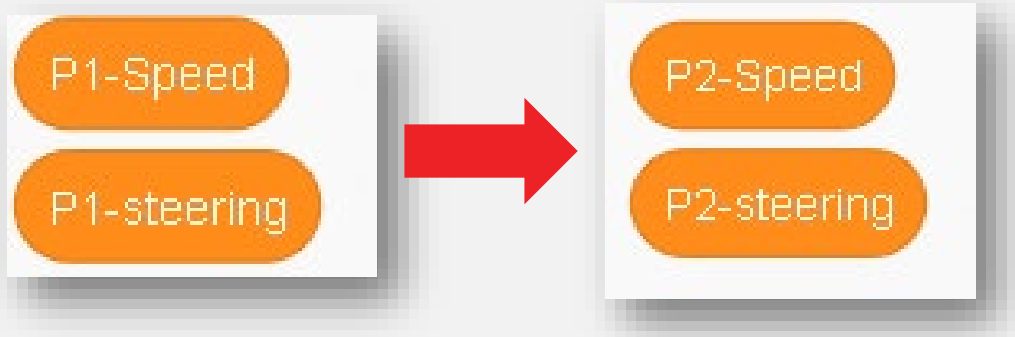
Make Car run slower when it's off-track



So we will make the friction higher when the car is running off-track, which is 20% depletion of speed and 30% depletion of steering.
(it was 10% & 20% when running on track.)

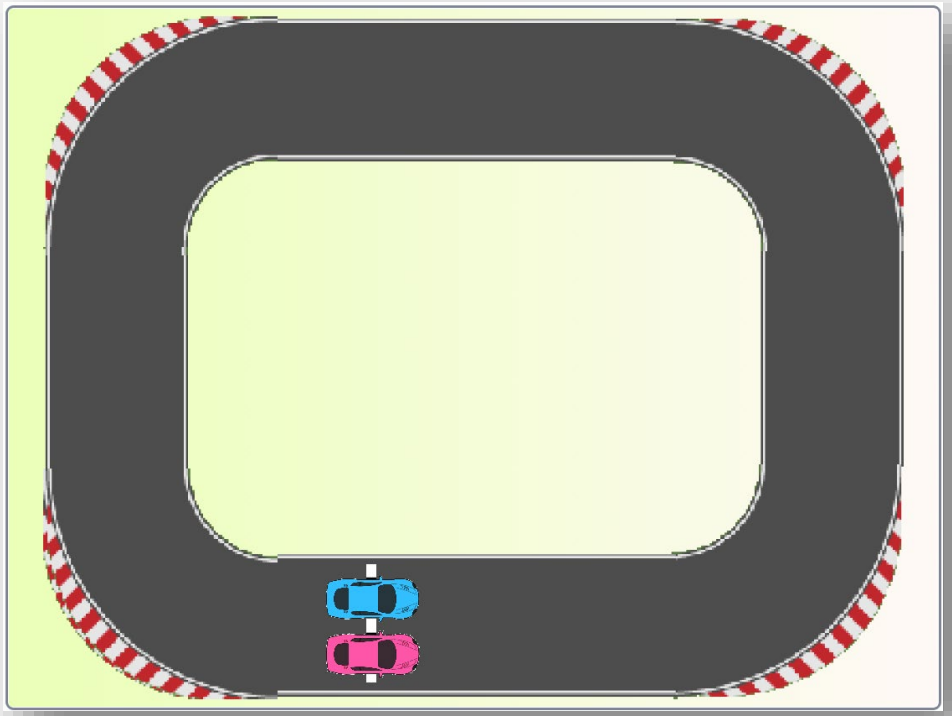
We will put an if-else statement over here and execute the conditions by checking if the car is running on- or off-track.

Duplicate Car for Player 2



Now you can duplicate for P2, then change all variables to P2 variables (You will need to create them).

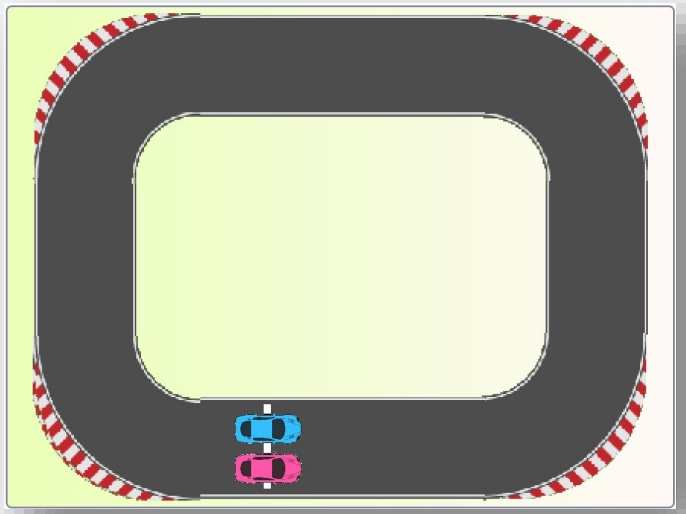
Mission 2-6 – Car Race Game



Run your game & Play it.

User Interface Setting – Menu Page

Menu Page



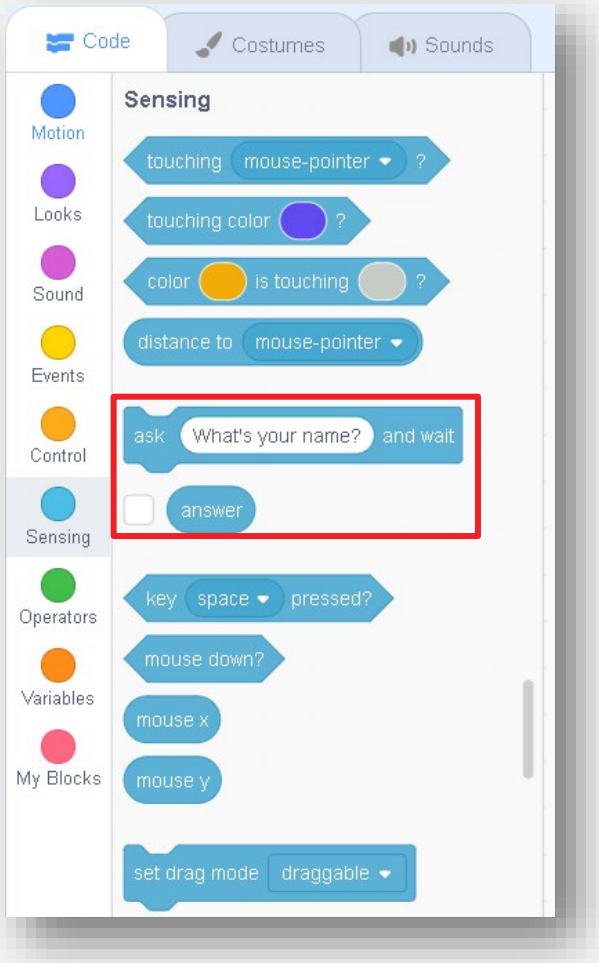
Game

Let's plan out our menu page for the car race game.

Ho would you like the menu page to look like? What functions would you like to have?

At the end, we will show the score and announce the winner, then give the player option to replay.

Sensing – Input & Answer

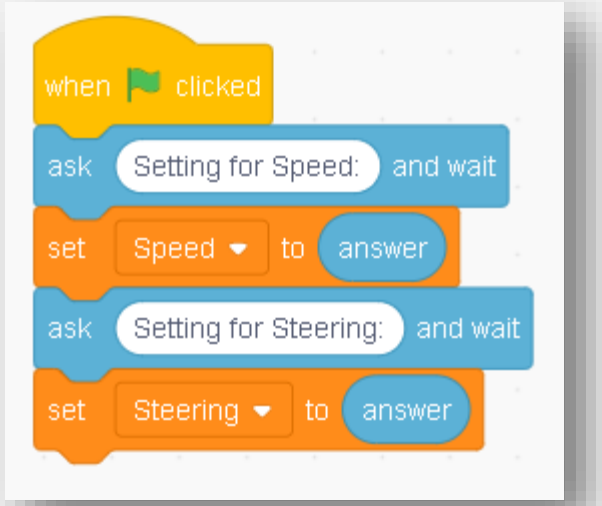


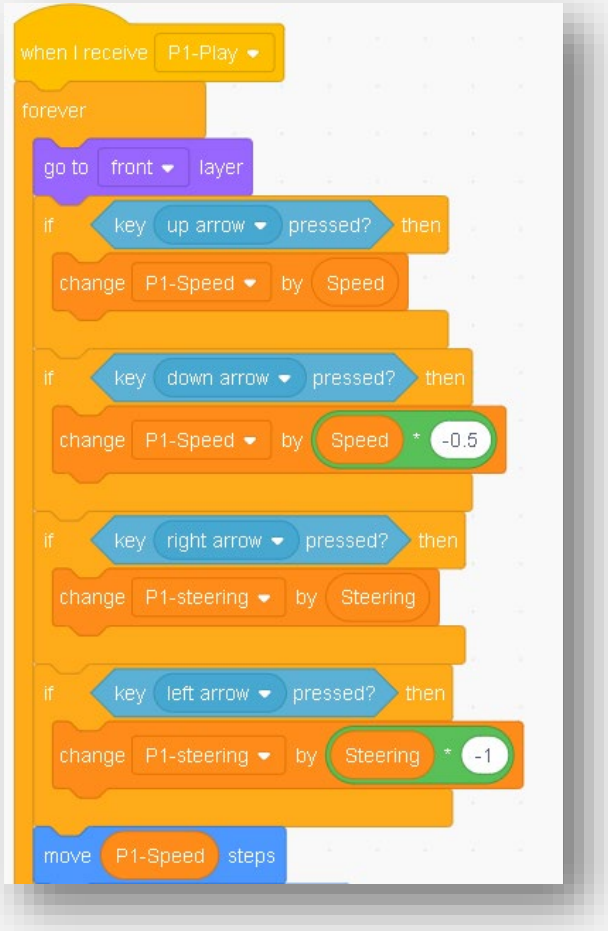
In the sensing category, we will have 1 block called "ask ___ and wait" & an answer block.

The "ask and wait block" lets player to key in some input into it and store it into a variable called "answer".

As it only has 1 variable, so if you prompt the second question, the latest input will always cover the previous one.

Sensing – Input & Answer





We can set our speed and steering at start then link it to the speed and steering for P1 & P2.

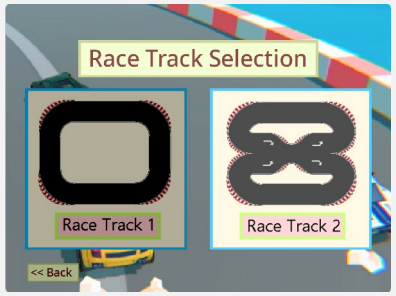
Sensing – Input & Answer

This will allow player to change the variables in game which are with wide range of options such as "speed", "timer", "Race", "Player's name" and etc.

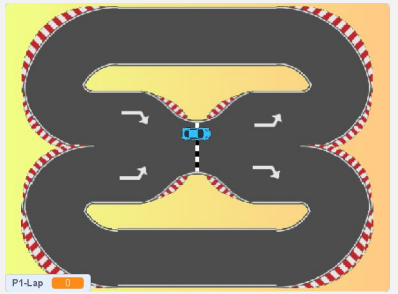
User Interface Setup

Menu

Game Mode



Race Track



Game Play

Play Again

We need 5 pages (or "5 states") for our game which include "Menu", "Game Mode Selection", "Race Track", "Game Play", and "Play Again".

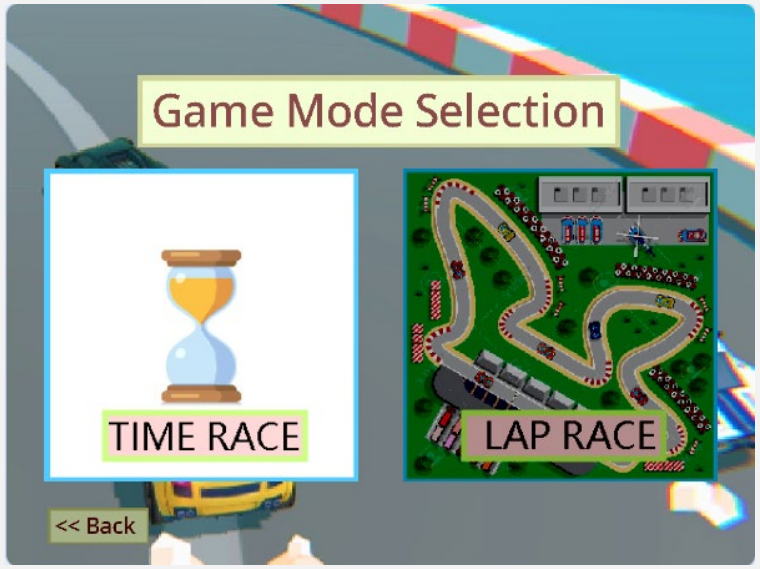
User Interface – What's selectable for Player

Menu

In "Menu" page, we have these options:

1. **Single Player – Only 1 player is playing the game.**
2. **2 Players – 2 players will be playing the game**
3. **Setting – To set speed, lap, timer, steering, username, sound volume.**
4. **How to Play? – Instruction / tutorial.**

User Interface – What's selectable for Player

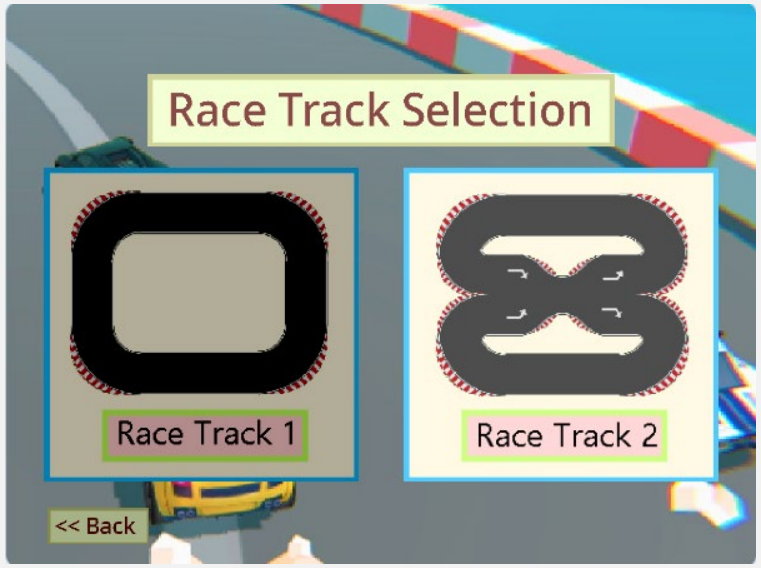


Game Mode

In "Game Mode" page, we can select the mode we want to play with:

1. **Time Race – You will be given a timer (e,g. 2 minutes) and your car will stop after time's up, the player completes more lap wins.**
2. **Lap Race – Player needs to complete certain laps to win, whoever completes first wins the game.**

User Interface – What's selectable for Player

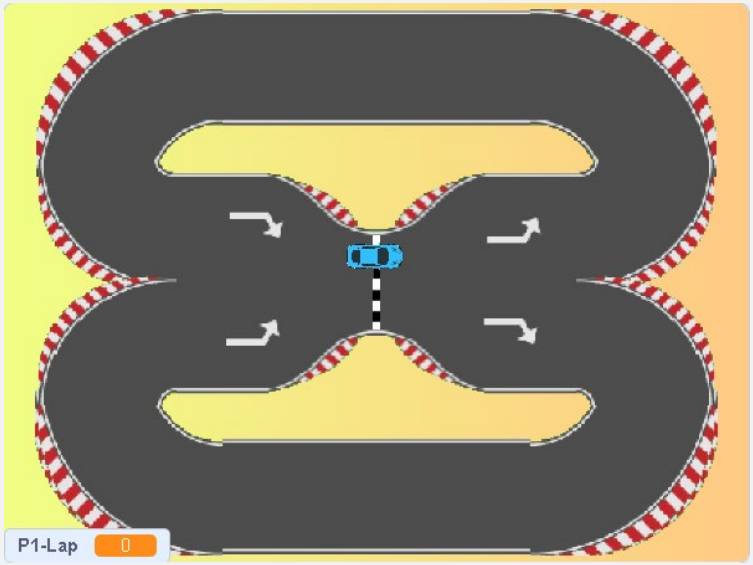


Race Track

In "Race Track" page, we can choose the race track we want to race with:

1. **Race Track 1 – For beginner or new player.**
2. **Race Track 2 – Race in "8-shape", for intermediate car racer.**

User Interface – What's selectable for Player



Game Play

"Game Play" is where the car race starts, it will base on previous game mode and race track selection to show the player of the cars, which race track is chosen.

And it will have 3 seconds count down before race starts.

User Interface – What's selectable for Player

Play Again

Once the lap is completed or time is up (depends on the game mode selected by players), it will pop up a box and show who wins the game, followed by a "Play Again" and "Back to Menu" buttons.

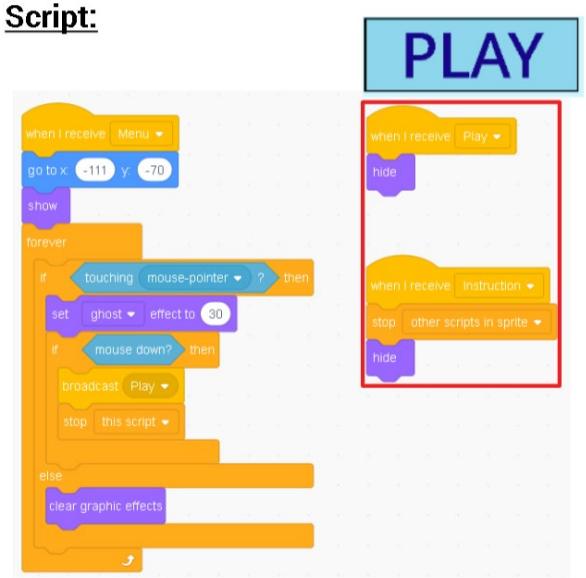
1. **Play Again – Straight go back to the game mode page.**

2. **Back to Menu – Go back to the menu**

Button's Script

Buttons on Menu Page

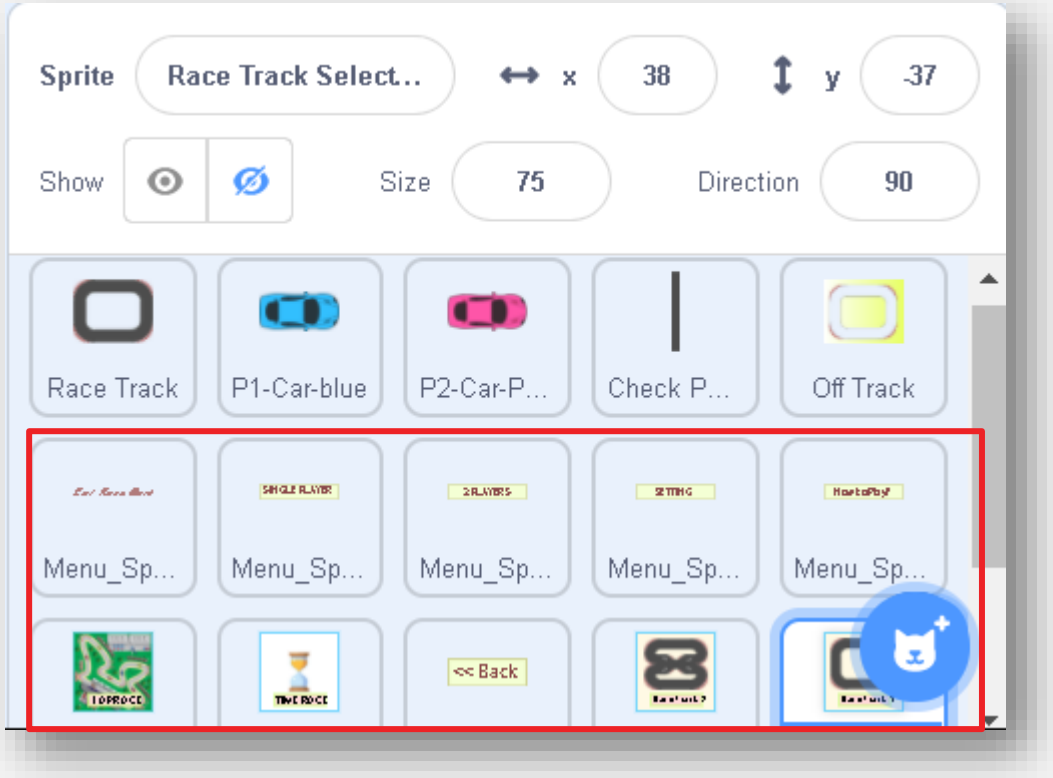
Script:



As these 2 buttons are also using same functions but different broadcast, so we can just duplicate the "Play" button and change the word to "Instruction".

The button script is similar to the Lesson learnt from L1-10 Menu & Settings.

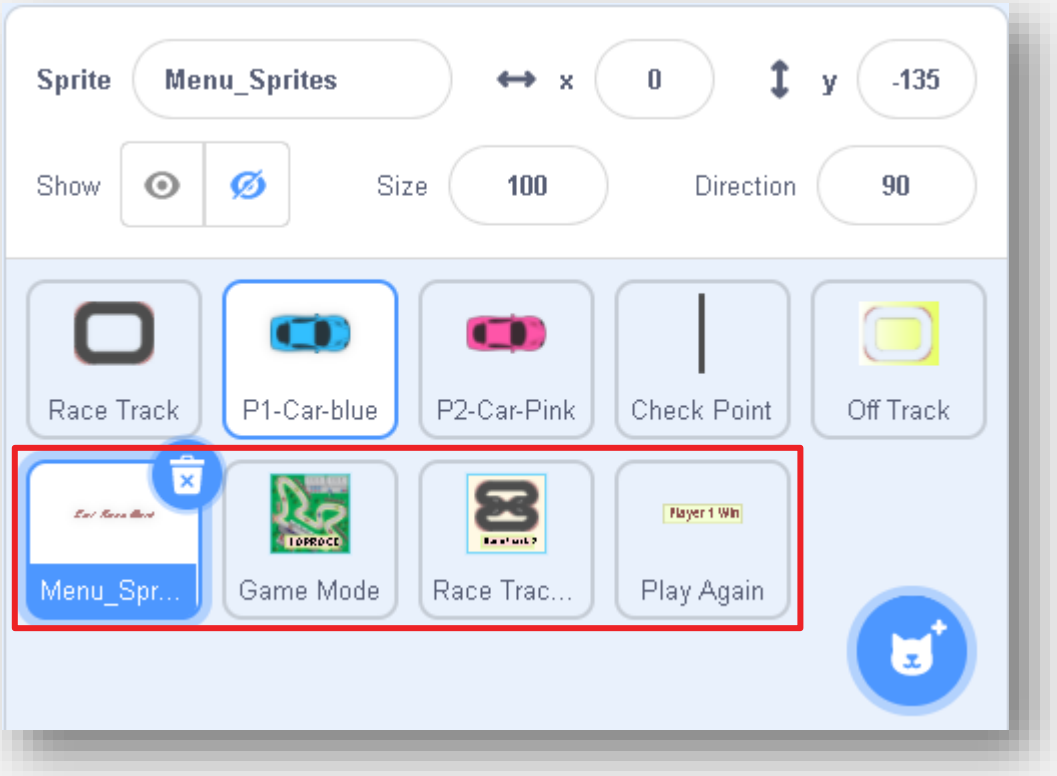
Button's Script - Problem



As the number of pages increase, creating too many sprites will make us very confused with different buttons.

Instead of using previous method to script out our button, we have a better way to manage and refactor our codes.

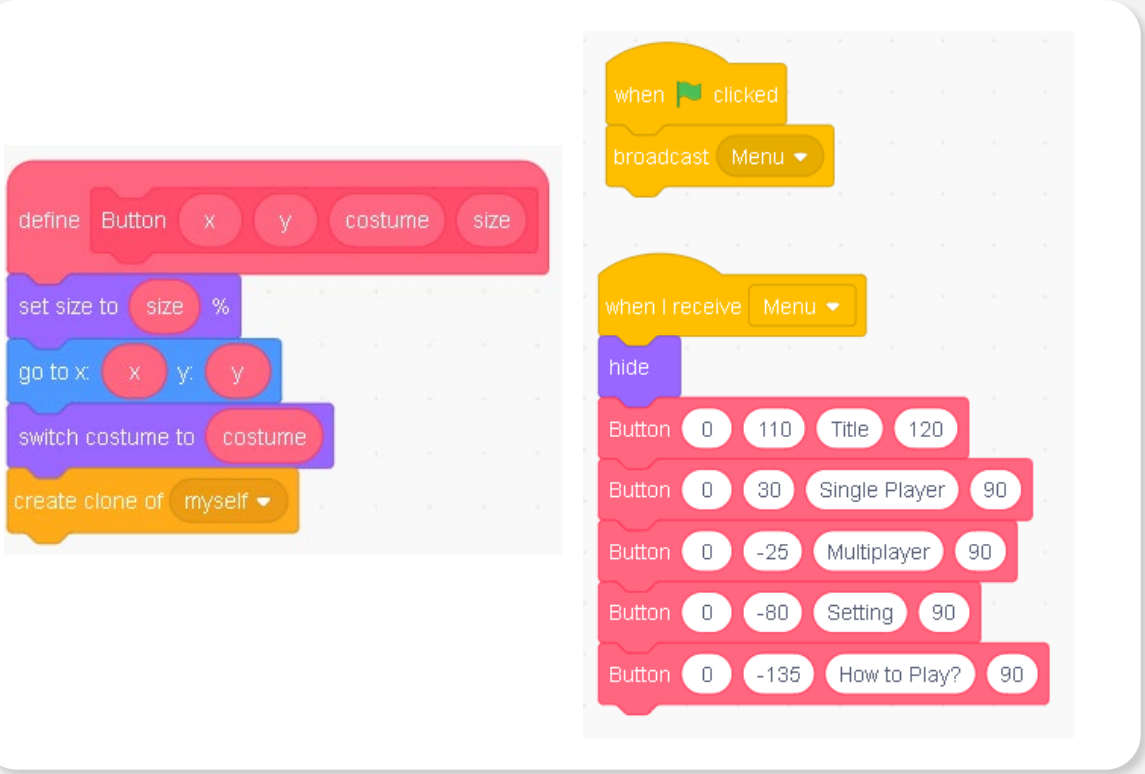
Button's Script – An Alternative Way



Instead of creating different button in form of sprites, we will create buttons as costumes and make the element to a sprite by page.

For example, all buttons required to present in Menu page will be under "Menu_Sprites", and we just create clones for those buttons.

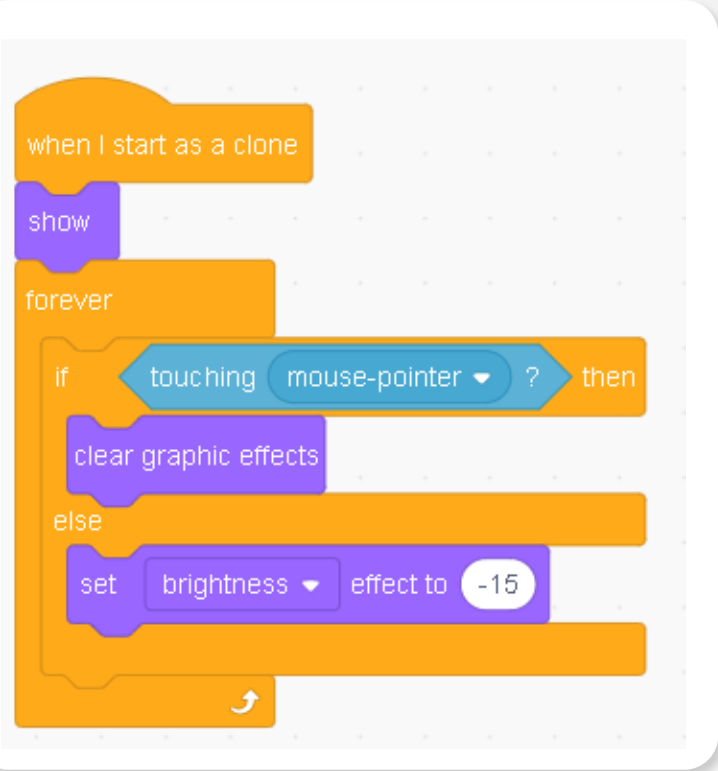
Button's Script – Create Clones Method



Let's create clones for all these buttons, but we won't be using any real body as our button, so I will hide it from start.

I define my customized block with 4 input (x position, y position, costume name, size), and rename this block as "Button".

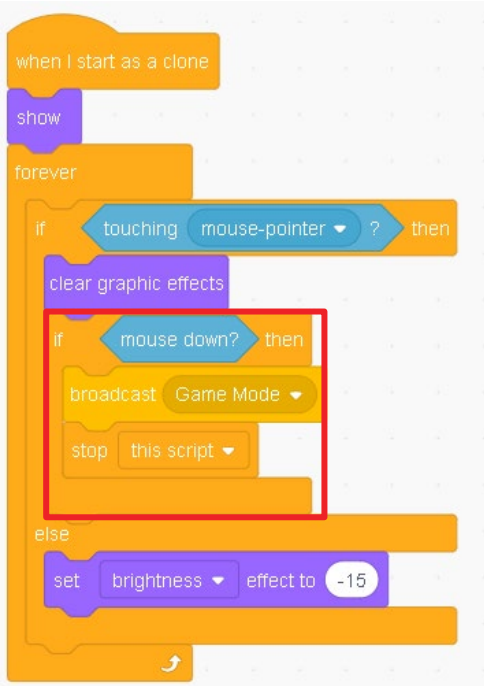
Button – Clone Script



Let's set the brightness to darker (-15) if we didn't hover our mouse on the button but will clear the effect if our mouse pointer is hovering on the button.

Then the player should see the difference when they want to make the selection.

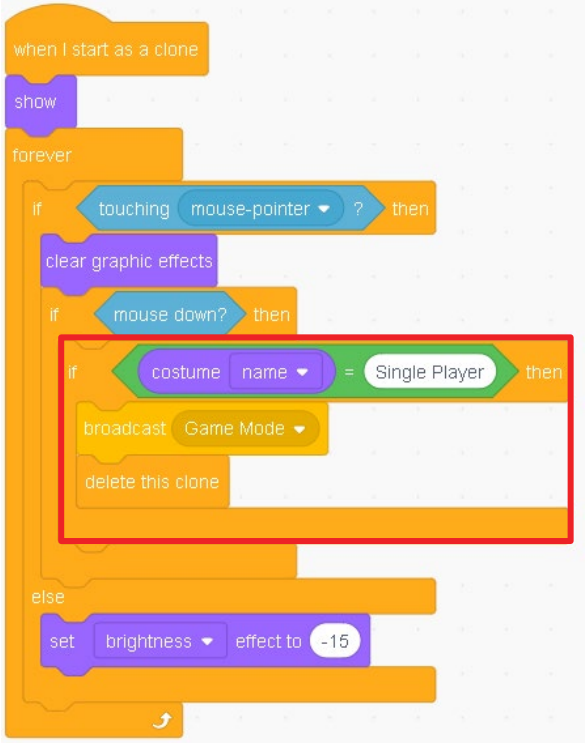
Button – Clone Script



Then we will have 1 if-statement inside to check if the mouse is clicked when the pointer is touching the button.

But as we have different button, and this function is for clones, so each clone will broadcast Game Mode no matter you are clicking single player, 2 players, setting or How to Play.

Button – Clone Script



Therefore, we have to check which costume (or which button) the player is touching on it. Based on the button clicked, it will broadcast different messages:

1. **Single Player → "Game Mode"**
2. **2 Players → "Game Mode"**
3. **Setting → "Setting"**
4. **How To Play? → "How To Play?"**

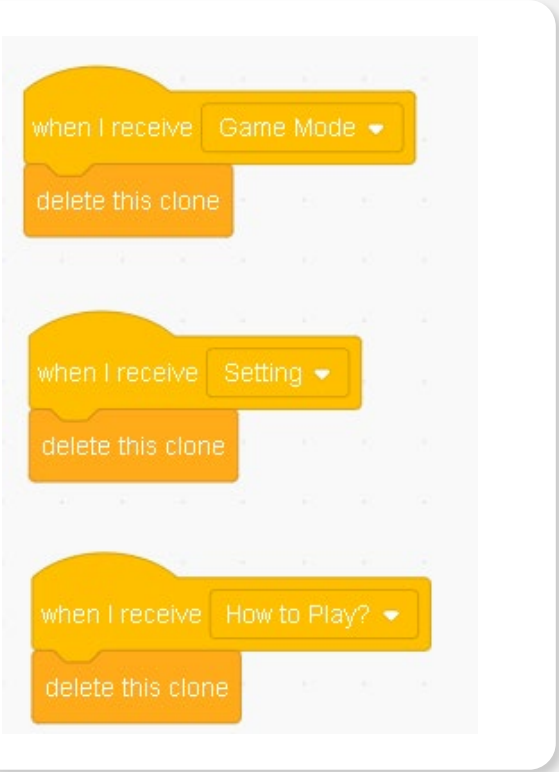
Button – Clone Script

Let put all of these conditions into the if "Mouse down?" loop.

Button – Clone Script

With the script that we setup just now, when we run our game and try to click on 1 button, only the button we clicked will disappear and it won't apply to other unless we clicked on others.

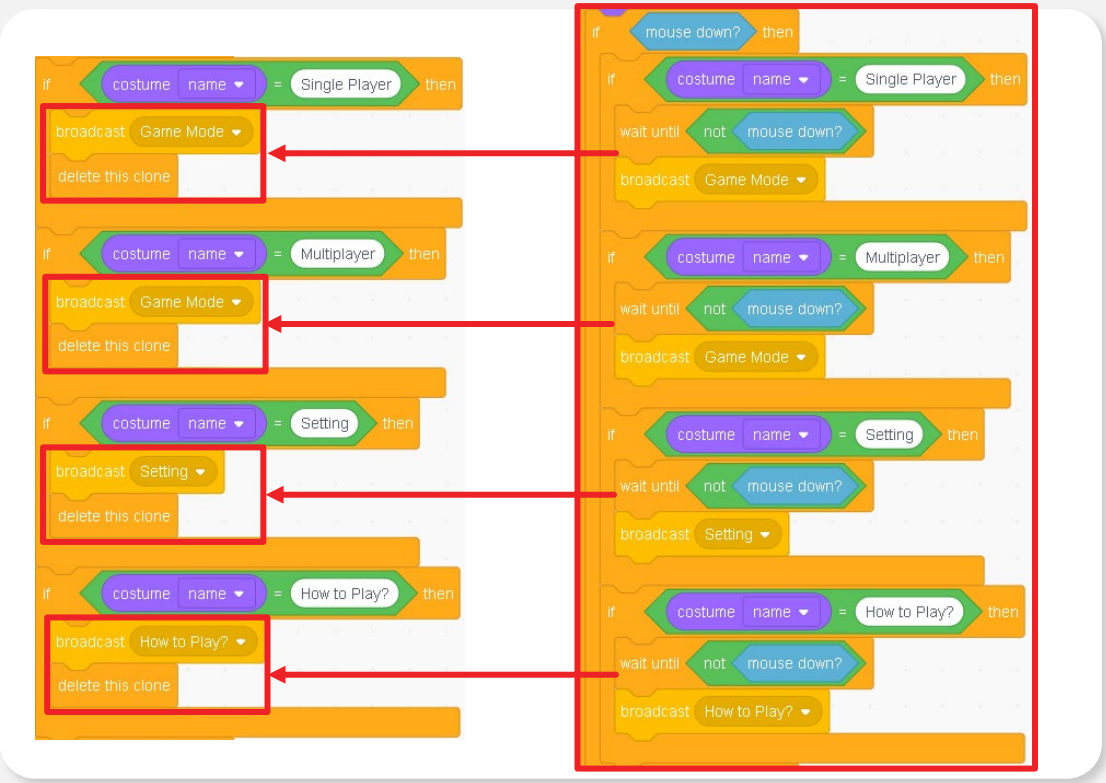
Button – Delete Clones



If we want every button to disappear after the player made the selection on any of the buttons.

We ask each clone to delete itself when received any of the messages broadcasted.

Button – Delete Clones



We don't need delete clone inside anymore as it will delete itself when received any of the broadcasts.

Before we broadcast to delete the clones, we want to make sure the mouse is up (released), otherwise it will cause double click issue to happen.

Button – Clear effect only for Title

You may notice that your title will also have the button effect when you hovering on it, but it won't respond anything when you clicked it. How should we clear this effect only for the Title?

Button – Clear effect only for Title

Let's apply all button effect only for buttons.

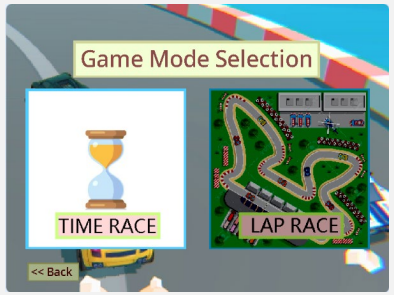
So we will have an if-statement to check if the costume is not "Title" before we apply the effect to the button.

Menu Page

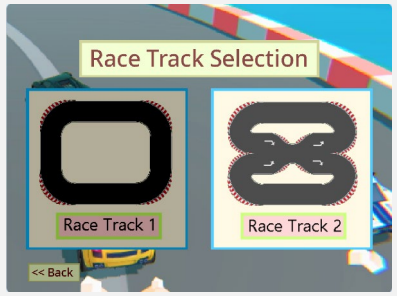
Noe the Menu Page should be done, let's try and see if your button works or not.

Menu Page

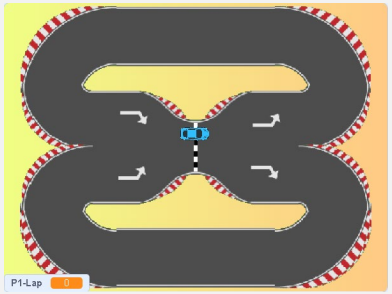
Menu



Game Mode



Race Track



Game Play

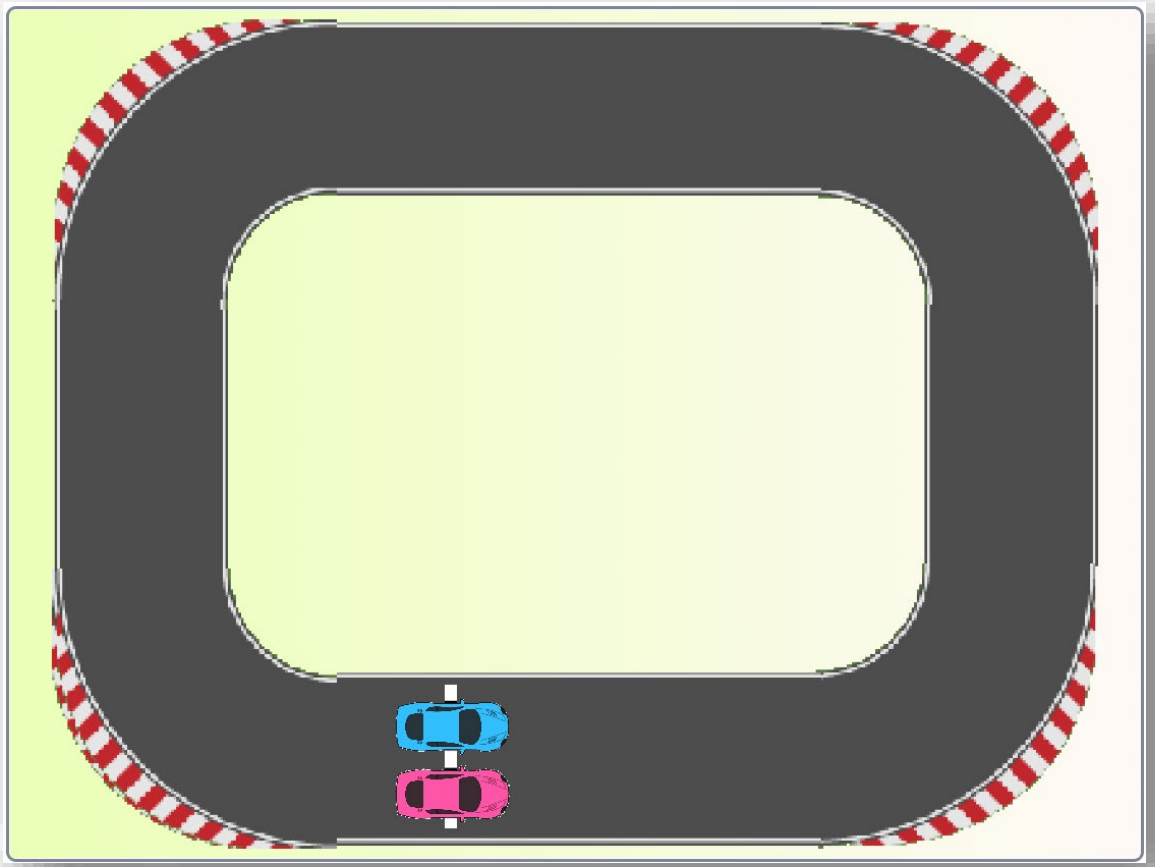
Play Again

Now let's apply the same method to other pages also.

You can duplicate from the Menu_Sprite and amend the broadcast and function inside for elements from other pages.

ASSIGNMENT *for*

Lesson 2-7



L2-7 – Mission

Create User Interface (“Menu”, “Game Mode”, “Race Track Selection”, “Game Play”, “Play Again” pages) for the game.

2 Game Modes options (Time race or Lap Race), 2 Race Tracks.

Use variables to take in these game mode selections, so you will know what to present at the Game Play page.

You can direct message your teacher and ask your question through Slack Robotene Community or arrange a One-to-One Consultation with your teacher.

Any Questions?

Thank you :)