A Project Report on

The Ultimate Drive

Car and Motorbike rally

2019F_MAD 3004_1 Introduction to swift programming

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Role of Members:

- **Supriya Sachdeva:**
  Worked on Test part 1 and Test part 4, also added description, Formula used, user manual and conclusion within the report.
- **Geeta Rani:**
  Worked on Test part 2 and Test part 3, also added Methods, Classes, Attributes within the document along with the references.

Contents

Description

The Ultimate drive is a scenic drive with a purpose, a chance to enjoy one can describe it as, "The most intense thing any individual has ever done." Considering that as, "most intense thing" can be done on a track without ever breaking any laws in a car with absolutely no modifications – it's clear that The Ultimate drive is much more than a simple phrase can describe. Because events involve speed, teams may need specialized equipment for their car. Although there are classes for vehicles with the Ultimate Drive-specific equipment on them, often teams will do the event and on basis of the performance the final decision that driver with which car performed well will be taken.

Initially the user will have to enter total number of vehicles that participated in the rally. Further user will be adding the details of the vehicle that include name, maximum speed, weight and fuel in the vehicle. Later user needs to decide whether it is car or a motorcycle and if it is a car then is it racing car or touring car. Apart from this user will also have to state whether the vehicle has a side car or not. The vehicle lighter in weight and the faster in speed will have better performance because it consumes less energy.

The class Grand Prix is a "heterogeneous collection" of vehicles. This collection represents the set of vehicles participating in a race. Basically, it would be verified that both the vehicle have the right to race together according to the type of vehicle participating, property of them having a side car or depending upon whether it's a racing car or touring car. The condition that we need to follow here is that the cars don't have the right to race with two-wheeled; the motorcycles having a "sidecar" are not considered as vehicles with two wheels; the two-wheeled have the right to race together.

However, we will have to test if the vehicles have the right to race together; if not, the message "Not Grand Prix" will be displayed and the method run will terminate its execution. The decision also depends on the amount of fuel used within the race. This is how we can get to know driver with which vehicle wins the race

Classes, Methods & Attributes

Class:

Class : Vehicle() – this is a super class . Vehicle class allows to represent a vehicle that participates in the races.

Class Vehicle() includes initializer initializing the attributes using values passed as parameters and a default initializer initializing the name with "Anonym", the level of fuel with zero, the maximal speed with 130 and the weight with 1000.

Class vehicle has following attributes::

- Name of the vehicle is of type String
- Maximal speed of vehicle is of type Double
- Weight of vehicle in kilograms if of type Integer in
- Level of fuel in the tank of vehicle is of type Integer

Methods used in Class vehicle

- A method **better** named as (Func isBetter) returning true if the current instance has a better performance than the other vehicle.

- Class vehicle include and use a tool method **performance**.
  This method return an estimation of the performance of the vehicle like the ratio between the maximal speed and its weight

- Function **takeInput** (func takeInput):It allows the user to give inputs.

- Class vehicle includes a **method (func isTwoWheeled())** which will check the type of the vehicle that is two wheeled has a side car.

Formula of Calculation of performance:

```
func performance() -> Double{
let ratio : Double = (speedMax / Double(weight))
```

Super Class

- Rally()
  It is super class.

Sub-Class

- Moto()
  It is a sub class inherited from super class i.e vehicle()

  Attribute of Moto subclass
  Class moto has attribute side class which is Boolean type

- Car()
  It is a sub class inherited from super class i.e vehicle()
  Class car has two categories that are:
  1.Racing car
  2.Touring car

- Grandprix()
  It is a sub class inherited from super class Rally()

Method: Add()

Class grandpix includes method Add func adds vehicle

Method:run()

A method run (func run(turn: Int))will add the number of turns in the track

Method:check()

A method check func (check()->Bool) which will checks that the vehile has right to race with another vehicle

Formula applied

Physics terminology on basis of which the performance is calculated is mentioned below:

- Speed: The rate at which someone or something is able to move or operate
- Weight: A body's relative mass or the quantity of matter contained by it, giving rise to a downward force; the heaviness of a person or thing.
- Ratio: The quantitative relation between two amounts showing the number of times one value contains or is contained within the other.

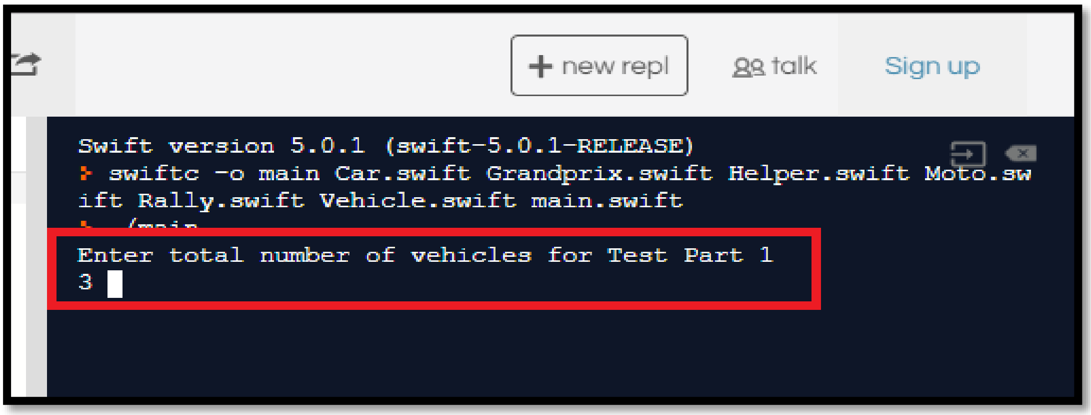
The lighter and the faster the vehicle is, the better is its performance because it consumes less energy

- Performance=Speed of the vehicle/Weight of the vehicle

Apart from this performance of the vehicle also depends on the fuel in the vehicle.

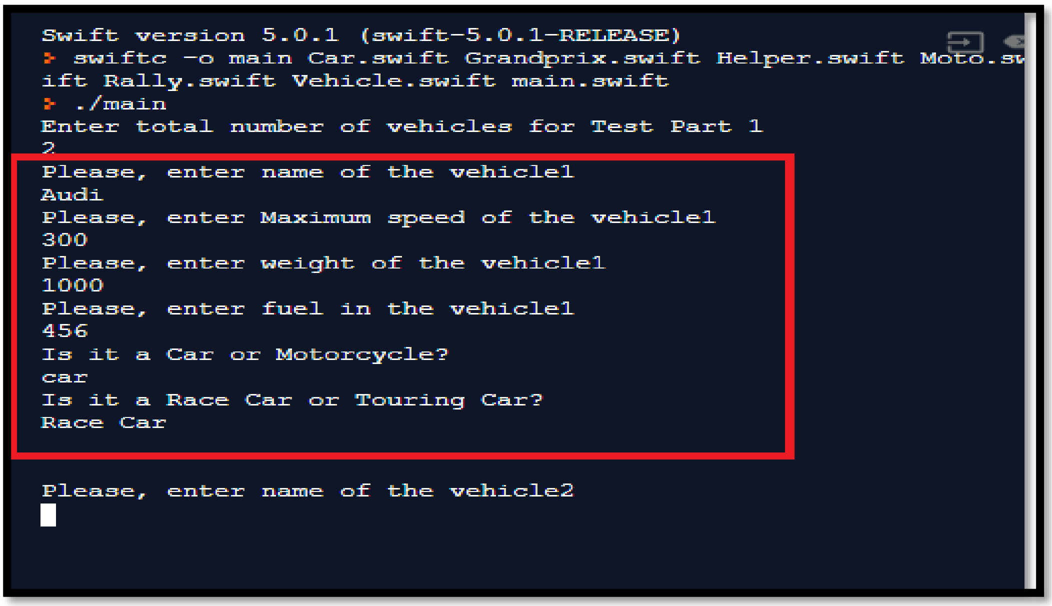
User Manual

1. a project that is working as per the requirement. Initially the user will have to add the number of vehicles that are participating in the race as shown in below screenshot.



```
Swift version 5.0.1 (swift-5.0.1-RELEASE)
› swiftc -o main Car.swift Grandprix.swift Helper.swift Moto.sw
ift Rally.swift Vehicle.swift main.swift
› ./main
Enter total number of vehicles for Test Part 1
3
```

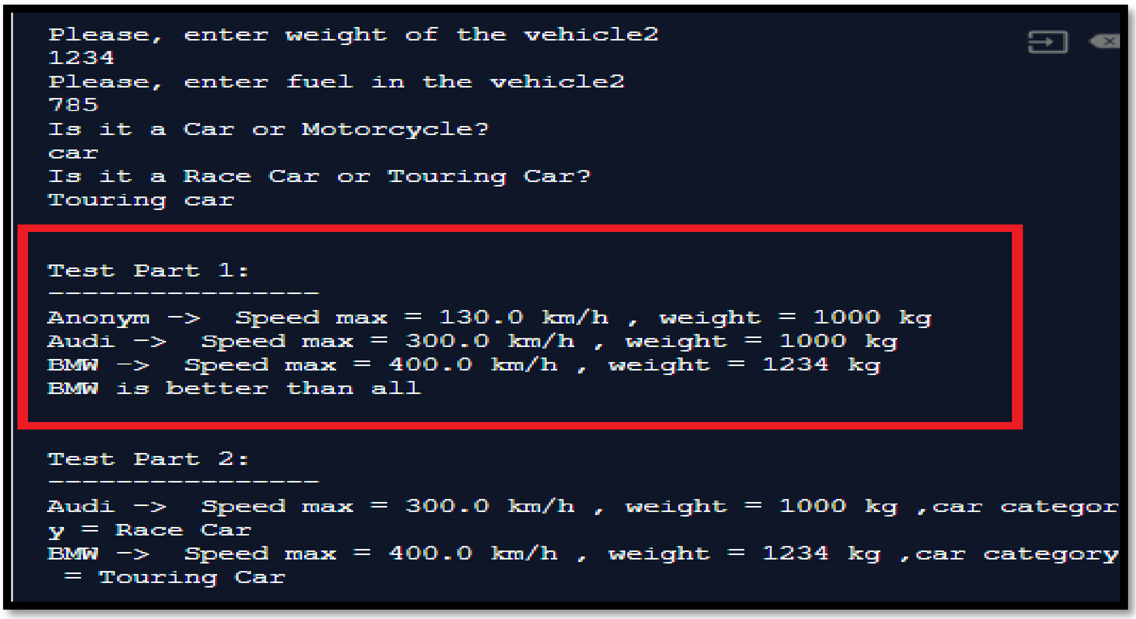
2. Now the user needs to add the details of the vehicle



```
Swift version 5.0.1 (swift-5.0.1-RELEASE)
› swiftc -o main Car.swift Grandprix.swift Helper.swift Moto.sw
ift Rally.swift Vehicle.swift main.swift
› ./main
Enter total number of vehicles for Test Part 1
2
Please, enter name of the vehicle1
Audi
Please, enter Maximum speed of the vehicle1
300
Please, enter weight of the vehicle1
1000
Please, enter fuel in the vehicle1
456
Is it a Car or Motorcycle?
car
Is it a Race Car or Touring Car?
Race Car

Please, enter name of the vehicle2
```

3. Here Anonym is the default value added by the user, further after adding all the details based on speed and weight performance of the vehicle will be calculated in Test Part 1.

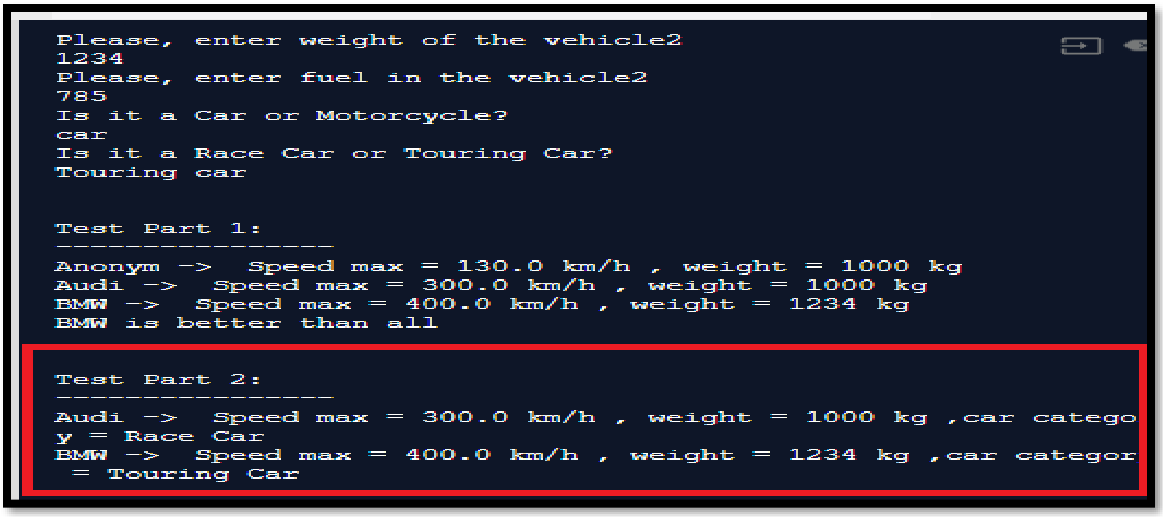


```
Please, enter weight of the vehicle2
1234
Please, enter fuel in the vehicle2
785
Is it a Car or Motorcycle?
car
Is it a Race Car or Touring Car?
Touring car

Test Part 1:
----------------
Anonym ->  Speed max = 130.0 km/h , weight = 1000 kg
Audi ->  Speed max = 300.0 km/h , weight = 1000 kg
BMW ->  Speed max = 400.0 km/h , weight = 1234 kg
BMW is better than all

Test Part 2:
----------------
Audi ->  Speed max = 300.0 km/h , weight = 1000 kg ,car categor
y = Race Car
BMW ->  Speed max = 400.0 km/h , weight = 1234 kg ,car category
 = Touring Car
```

4. In test part 2 the content is displayed in certain String Format which also includes whether the vehicle is car or motorbike and if it’s a car then which type of car is participating in the race is also included.



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Please, enter weight of the vehicle2
1234
Please, enter fuel in the vehicle2
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Is it a Car or Motorcycle?
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----------------
Audi ->  Speed max = 300.0 km/h , weight = 1000 kg ,car catego
y = Race Car
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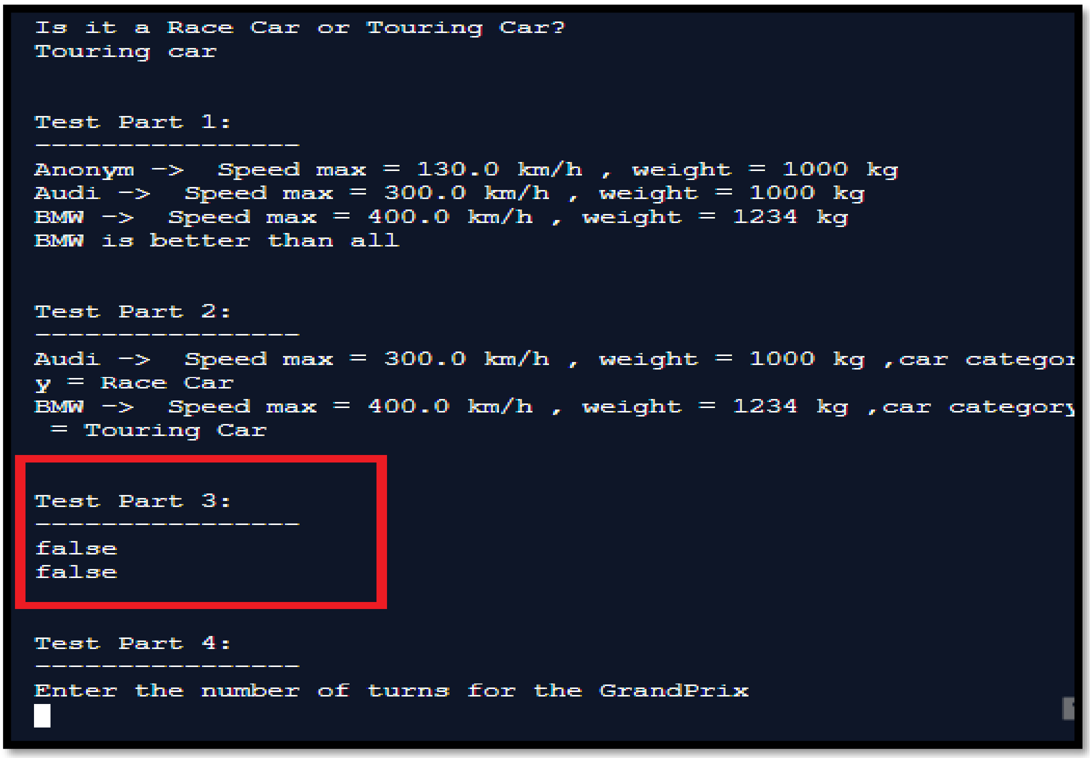
 = Touring Car
```

5. Further two vehicles are compared whether they have right to race together or not depending on the type of vehicle it is and whether its having a side car or not. If the vehicles are two wheeled then true will be printed and if all vehicles are four wheeled false will be shown up. If two wheeler has a side car then it is considered as four wheeler.



```
Is it a Race Car or Touring Car?
Touring car


Test Part 1:
----------------
Anonym ->  Speed max = 130.0 km/h , weight = 1000 kg
Audi ->  Speed max = 300.0 km/h , weight = 1000 kg
BMW ->  Speed max = 400.0 km/h , weight = 1234 kg
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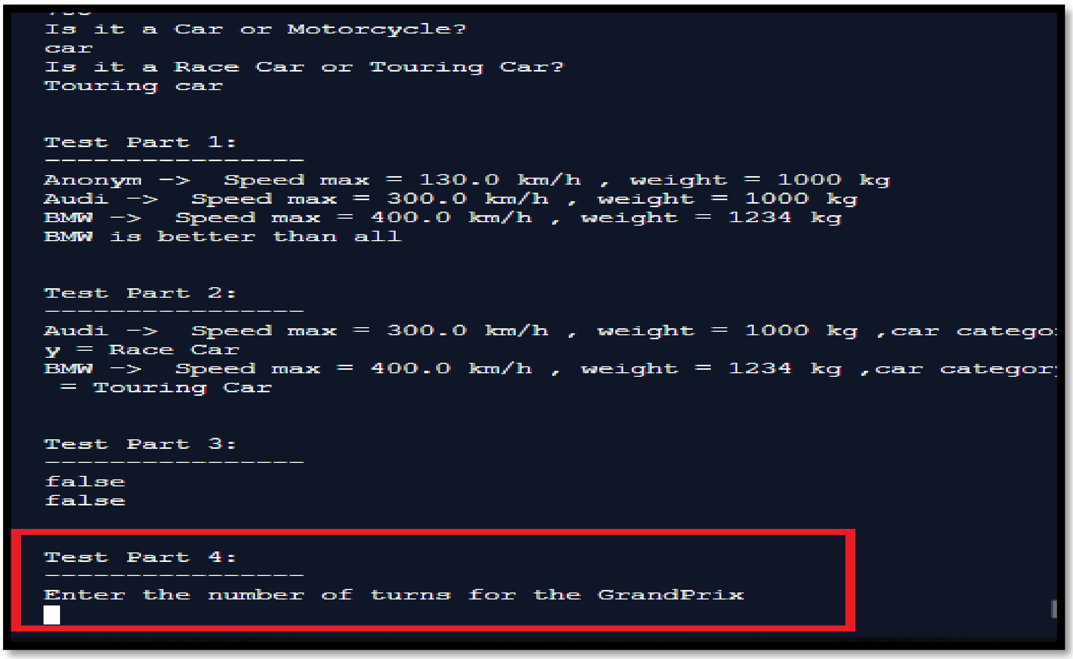
Audi ->  Speed max = 300.0 km/h , weight = 1000 kg ,car categor
y = Race Car
BMW ->  Speed max = 400.0 km/h , weight = 1234 kg ,car category
 = Touring Car


Test Part 3:
----------------
false
false


Test Part 4:
----------------
Enter the number of turns for the GrandPrix
```

6. If the vehicle don’t have right to race together “Not grand prix” will be displayed and if they can race together then we need to enter number of turns and after that the winner will be displayed.



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Is it a Car or Motorcycle?
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Is it a Race Car or Touring Car?
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Test Part 2:
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Audi ->  Speed max = 300.0 km/h , weight = 1000 kg ,car catego
y = Race Car
BMW ->  Speed max = 400.0 km/h , weight = 1234 kg ,car categor
 = Touring Car


Test Part 3:
----------------
false
false

Test Part 4:
----------------
Enter the number of turns for the GrandPrix
```

Conclusion

Using “The Ultimate Drive”- Rally project one can organize a rally add as many vehicles as needed. Further can also add the details and description regarding the vehicle like what is the name of the vehicle, weight of the vehicle, speed of the vehicle and fuel within the vehicle. Further within this project we have also added a option regarding side car, for vehicle also there are two different options whether the vehicle is car or motorbike so that we can get to know drivers with which car can compete together.

Initially it was a bit difficult for us to understand the project regarding how to find the performance of the vehicle. Referring to different sources on internet we came across various formulas to find performance using acceleration, velocity, speed, fuel consumption, weight of the vehicle. Later we added the formula which was the most appropriate according to our requirement. We have used various functions and methods to make sure that the project goes on well and we can get the appropriate output.

Our main aim was to develop such a project that its user friendly with least complexity so that user can easily organize a rally even though the individual is from non-technical background. Using various class ,method ,functions ,going through various references we have created

References

- https://www.projectcarsgame.com/the_insiders_guide/episode-6-rallycross/
- https://www.slideshare.net/ravijotsingh4/report-on-car-racing-game-for-android
- The example within the project