APIs and REST(RESTful) APIs

API

Also known as Application Programming Interface is a set of protocols and functions used in software to help interact with other software.

RESTful API

Short for **Re**presentational **S**tate **T**ransfer API, is a client server based API that uses URIs, HTTP protocols, and JSON for accessing data from the web.

Restful APIs execute CRUD through HTTP verbs(GET,POST,PUT,DELETE,PATCH) and data is exchanged through XML or JSON files.

```
POST :Request a URI with POST creates a resource
GET: Retrieves the resource and gets detailed information
about the document.
PUT: Replaces all current representation. Causes change
in state(Updates information) -> always call POST to view
changes
DELETE: Deletes information from server.
```

Consider an API that manages Student Resources.

```
{
  "id": 1,
  "firstName": "Tyrion",
  "lastName": "Lannister",
  "classes": [
    {"id": 1, "name": "History of Westeros"},
    {"id": 2, "name": "Brewing"},
    {"id": 3, "name": "High Valyrian 101"}
  ]
}
```

- [POST]/students: creates a new student
- [GET]/students: call the entire student list
- [GET]/students: call the first student
- [PUT]/students/1: Edit information regarding student 1
- [DELETE]/students/1: deletes student 1

Create a model called Post that conforms to the **Codable protocol.** The Codable protocol is used for encoding(from Swift to other(JSON))and decoding (from other(JSON) to Swift) the data we get from our API. You can choose which data you want to fetch from the API, I have decided to fetch all the data, which consist of userId, id, title, and body.

```swift
import Foundation

struct Post:Codable{
let userId: Int
let id: Int
let title: String
let body: String
}
```

Apple created a session called **URLSession** to help IOS programs communicate with servers. It supports HTTP protocols, which is what we need when we access RESTful APIs.

```swift
func callAPI(){
   guard let url = URL(string: "https://jsonplaceholder.typicode.com/posts/1")
else{
      return
   }

   let task = URLSession.shared.dataTask(with: url){
     data, response, error in

     if let data = data, let string = String(data: data, encoding: .utf8){
        print(string)
     }
   }

   task.resume()
}

callAPI()
```

Result:

```
{"userId": 1,
"id": 1,
"title": "sunt aut facere repellat provident occaecati excepturi optio reprehenderit",
"body": "quia et suscipit\nsuscipit recusandae consequuntur expedita et
```

cum\nreprehenderit molestiae ut ut quas totam\nnostrum rerum est autem sunt rem eveniet architecto"}

Decoding JSON

The above code just fetches data from an API using apple's URL Session. Lets try decoding the data. We need to decode the data since it is written in JSON format and we are using Swift. For this, we are going to use **JSONDecoder()**, which is an object that decodes data from JSON objects. For this example I am going to use the [full post API.](#)

Here I am taking every instance, decoding it, and printint the title of the Post.

```
func decodeAPI(){
    guard let url = URL(string: "https://jsonplaceholder.typicode.com/posts")
else{return}

    let task = URLSession.shared.dataTask(with: url){
        data, response, error in

        let decoder = JSONDecoder()

        if let data = data{
            do{
                let tasks = try decoder.decode([Post].self, from: data)
                tasks.forEach{ i in
                    print(i.title)
                }
            }catch{
                print(error)
            }
        }
    }
    task.resume()

}
decodeAPI()
```

Result:

sunt aut facere repellat provident occaecati excepturi optio reprehenderit
qui est esse
ea molestias quasi exercitationem repellat qui ipsa sit aut
eum et est occaecati
nesciunt quas odio