UNIVERSITY of GREENWICH
Alliance with FPT Education

BTEC

ASSIGNMENT 2 FRONT SHEET

Qualification	**BTEC Level 5 HND Diploma in Computing**		
Unit number and title	Unit 9: Cloud Computing		
Submission date		**Date Received 1st submission**	
Re-submission Date		**Date Received 2nd submission**	
Student Name		**Student ID**	
Class		**Assessor name**	
Student declaration I certify that the assignment submission is entirely my own work and I fully understand the consequences of plagiarism. I understand that making a false declaration is a form of malpractice.			
		Student's signature	

Grading grid

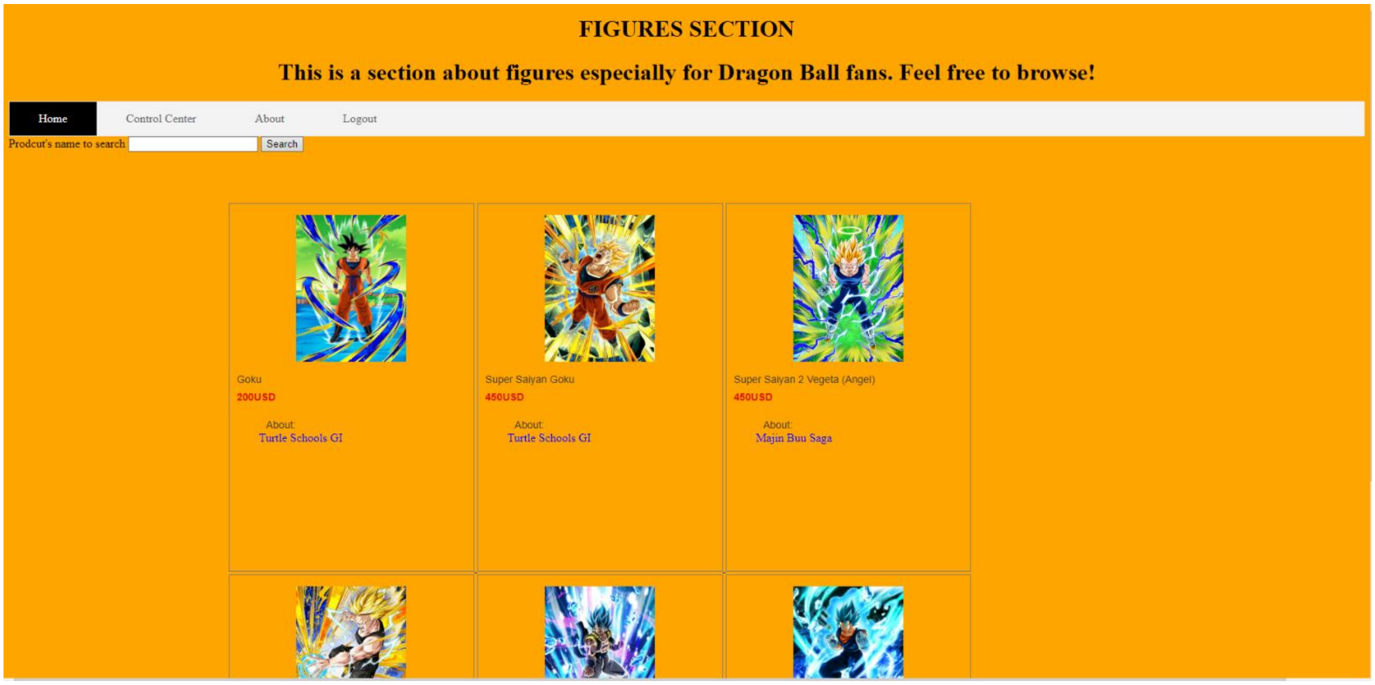
P5	P6	P7	P8	M3	M4	D2	D3

□ Summative Feedback:		□ Resubmission Feedback:
Grade:	Assessor Signature:	Date:
Internal Verifier’s Comments:		
Signature & Date:		

I. Introduction

II. Implementation of architecture design based on given scenario.

First, is the home page, where it's display the products (Name, Price, About and Added Date, Image)



FIGURES SECTION

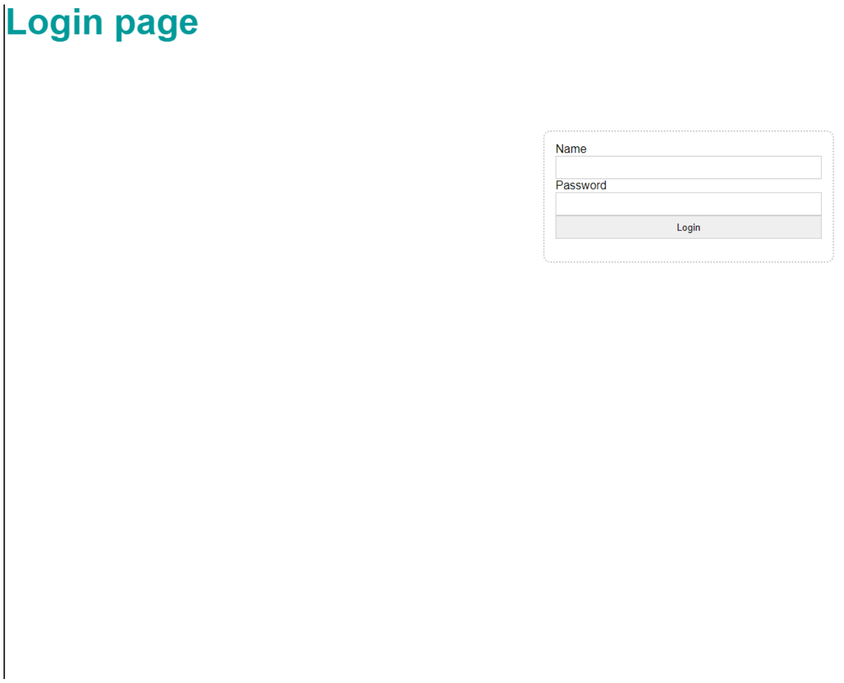
This is a section about figures especially for Dragon Ball fans. Feel free to browse!

Goku
200USD
About:
Turtle Schools GI

Super Saiyan Goku
450USD
About:
Turtle Schools GI

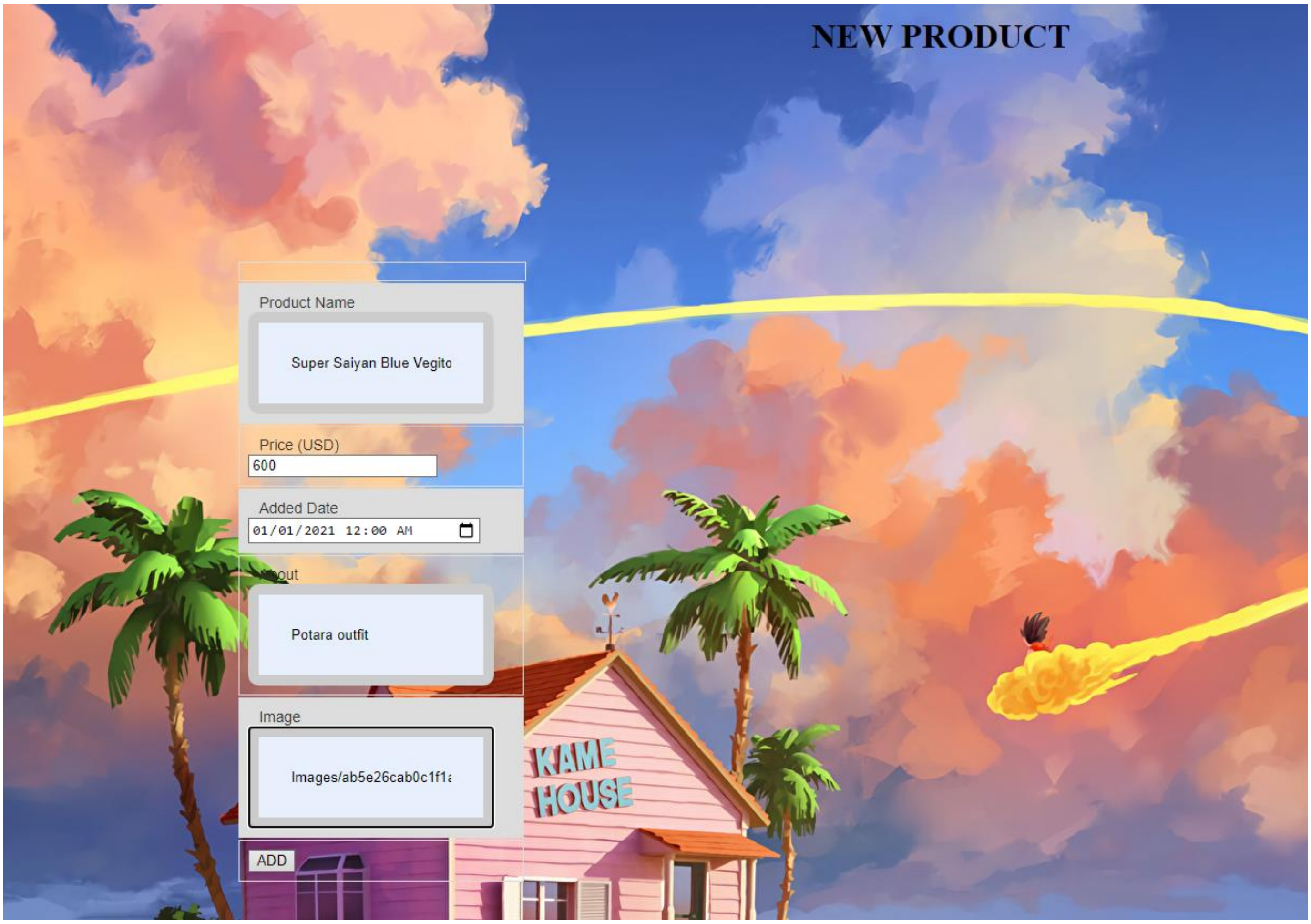
Super Saiyan 2 Vegeta (Angel)
450USD
About:
Majin Buu Saga

Next will be the login page:



Login page

To login, we just need to type (Name: admin, Password: admin). As an administrator, you can do thing such as add new product:



NEW PRODUCT

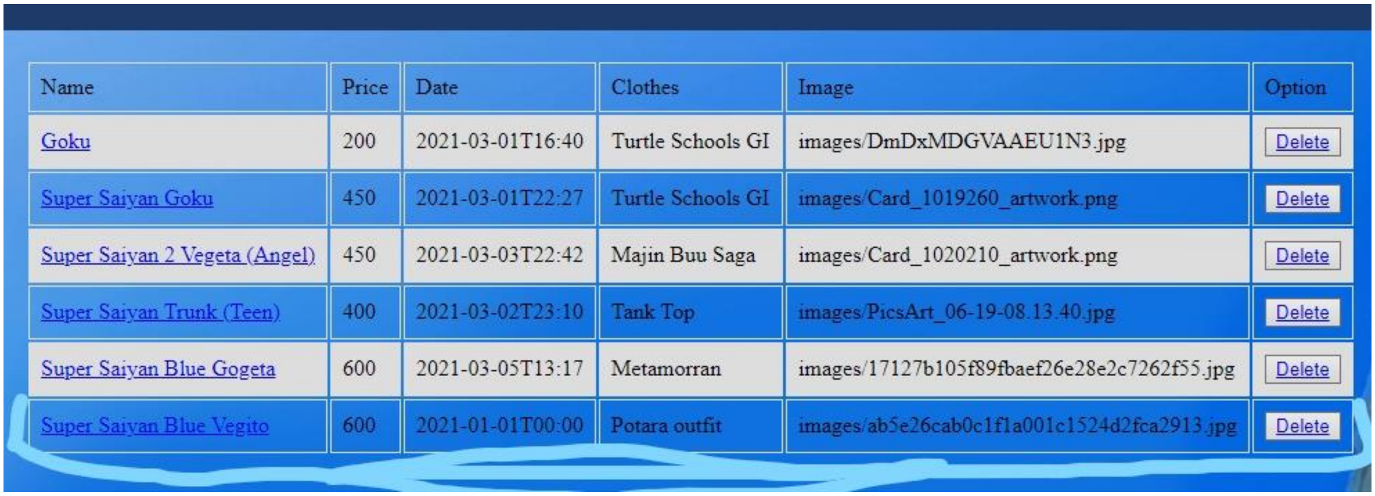
Product Name: Super Saiyan Blue Vegito

Price (USD): 600

Added Date: 01/01/2021 12:00 AM

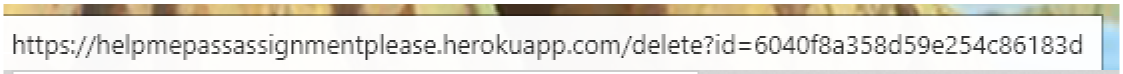
About: Potara outfit

Image: Images/ab5e26cab0c1f1a



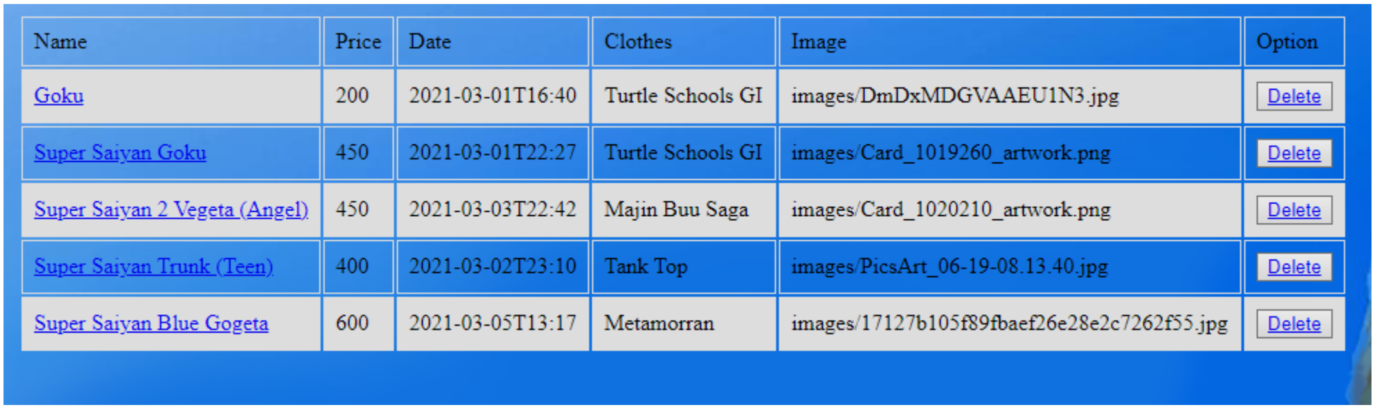
Name	Price	Date	Clothes	Image	Option
Goku	200	2021-03-01T16:40	Turtle Schools GI	images/DmDxMDGVAAEU1N3.jpg	Delete
Super Saiyan Goku	450	2021-03-01T22:27	Turtle Schools GI	images/Card_1019260_artwork.png	Delete
Super Saiyan 2 Vegeta (Angel)	450	2021-03-03T22:42	Majin Buu Saga	images/Card_1020210_artwork.png	Delete
Super Saiyan Trunk (Teen)	400	2021-03-02T23:10	Tank Top	images/PicsArt_06-19-08.13.40.jpg	Delete
Super Saiyan Blue Gogeta	600	2021-03-05T13:17	Metamorran	images/17127b105f89fbaef26e28e2c7262f55.jpg	Delete
Super Saiyan Blue Vegito	600	2021-01-01T00:00	Potara outfit	images/ab5e26cab0c1f1a001c1524d2fca2913.jpg	Delete

In the control center, aside from adding new product, you can delete them as well. To do that, you only need to move the cursor to the delete button and click it.



https://helpmepassassignmentplease.herokuapp.com/delete?id=6040f8a358d59e254c86183d

This is the result after removing the product:



Name	Price	Date	Clothes	Image	Option
Goku	200	2021-03-01T16:40	Turtle Schools GI	images/DmDxMDGVAAEU1N3.jpg	Delete
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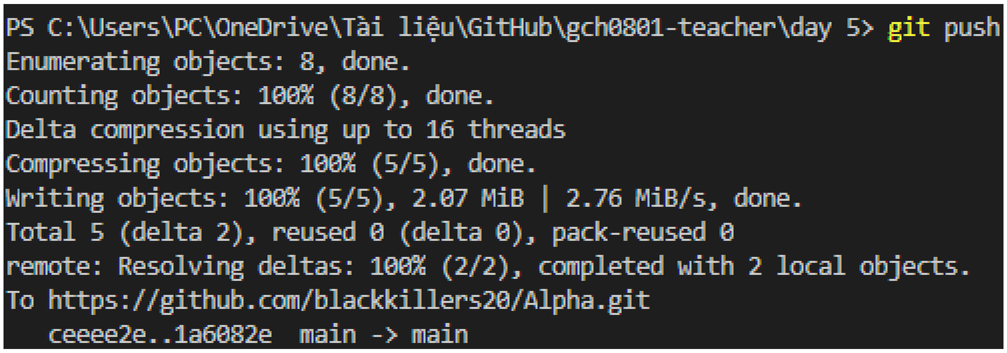
Super Saiyan Blue Gogeta	600	2021-03-05T13:17	Metamorran	images/17127b105f89fbaef26e28e2c7262f55.jpg	Delete

II.1 Upload to server

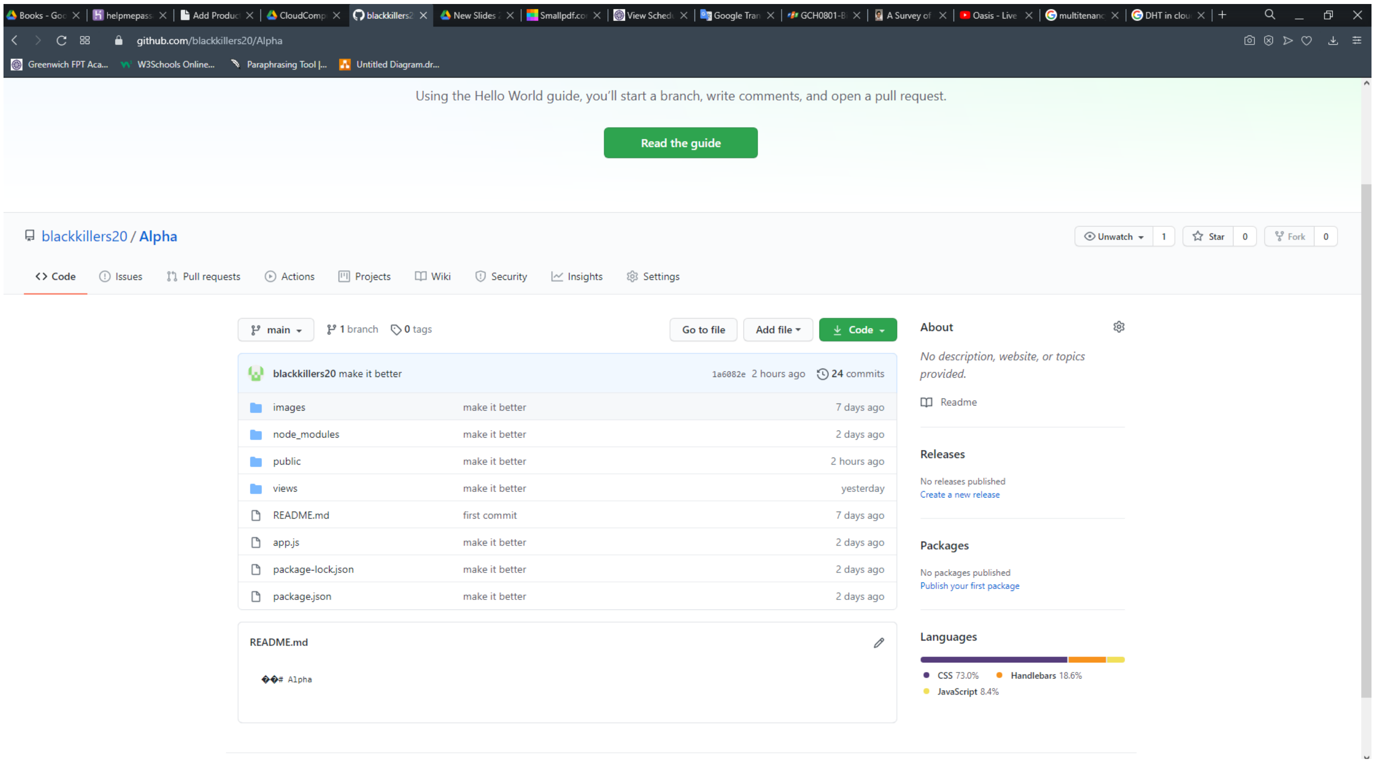
In the last report, I have explained the decision of choosing GitHub as a collaboration and Heroku as a server. Now, I will demonstrate the process of pushing my code to GitHub and deploy them in Heroku.

In my IDE, to push it into GitHub, I just simply type "Git push" in the terminal.



```
PS C:\Users\PC\OneDrive\Tài liệu\GitHub\gch0801-teacher\day 5> git push
Enumerating objects: 8, done.
Counting objects: 100% (8/8), done.
Delta compression using up to 16 threads
Compressing objects: 100% (5/5), done.
Writing objects: 100% (5/5), 2.07 MiB | 2.76 MiB/s, done.
Total 5 (delta 2), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (2/2), completed with 2 local objects.
To https://github.com/blackkillers20/Alpha.git
   ceeee2e..1a6082e  main -> main
```

This is the result:



Using the Hello World guide, you'll start a branch, write comments, and open a pull request.

blackkillers20 / Alpha

blackkillers20 make it better 1a6082e 2 hours ago 24 commits

images	make it better	7 days ago
node_modules	make it better	2 days ago
public	make it better	2 hours ago
views	make it better	yesterday
README.md	first commit	7 days ago
app.js	make it better	2 days ago
package-lock.json	make it better	2 days ago
package.json	make it better	2 days ago

README.md

��# Alpha

About

No description, website, or topics provided.

Readme

Releases

No releases published
Create a new release

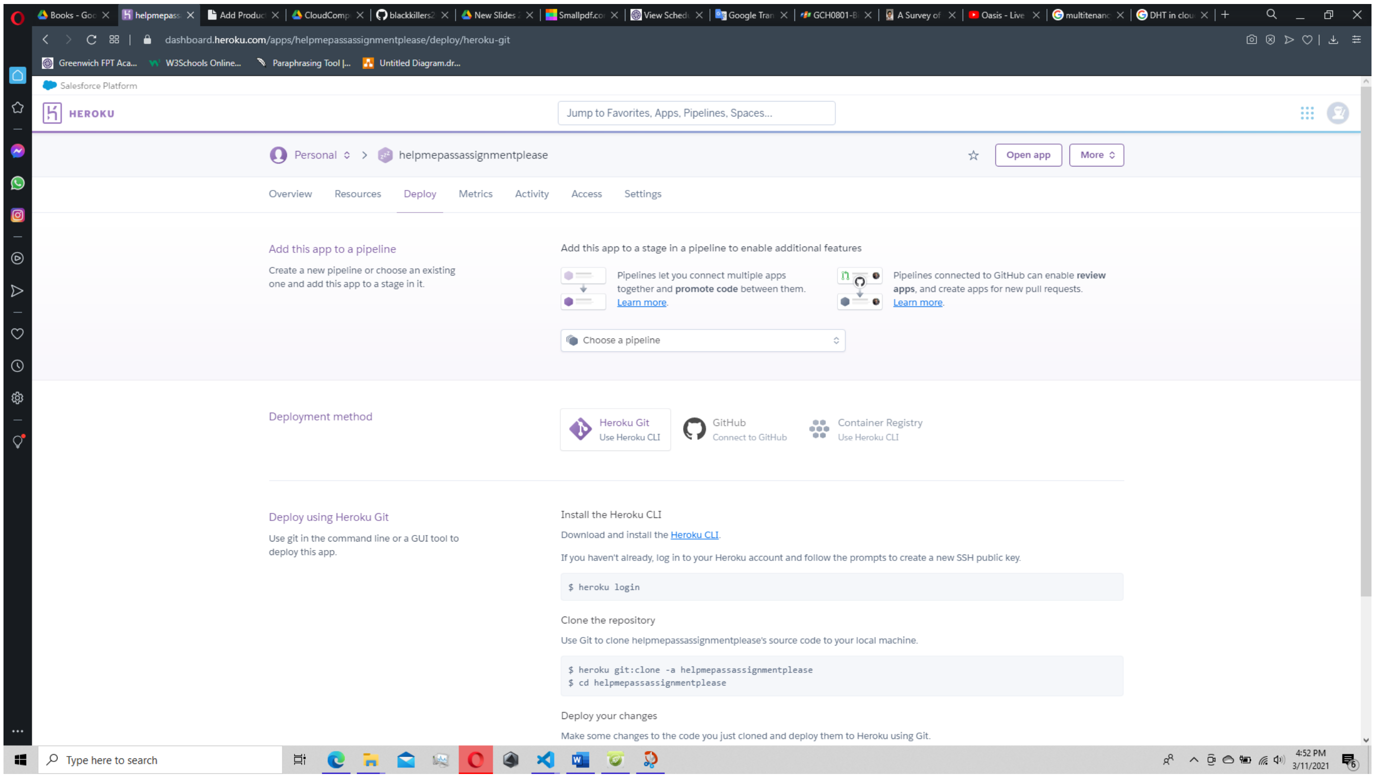
Packages

No packages published
Publish your first package

Languages

● CSS 73.0% ● Handlebars 18.6%
● JavaScript 8.4%

My GitHub link: https://github.com/blackkillers20/Alpha



Add this app to a pipeline

Create a new pipeline or choose an existing one and add this app to a stage in it.

Add this app to a stage in a pipeline to enable additional features

Pipelines let you connect multiple apps together and **promote code** between them. Learn more.

Pipelines connected to GitHub can enable **review apps**, and create apps for new pull requests. Learn more.

Deployment method

Deploy using Heroku Git

Use git in the command line or a GUI tool to deploy this app.

Install the Heroku CLI

Download and install the Heroku CLI.

If you haven't already, log in to your Heroku account and follow the prompts to create a new SSH public key.

```
$ heroku login
```

Clone the repository

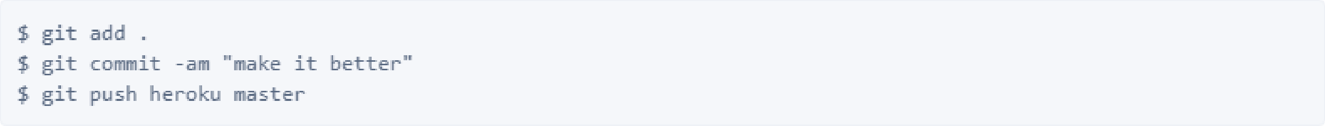
Use Git to clone helpmepassassignmentplease's source code to your local machine.

```
$ heroku git:clone -a helpmepassassignmentplease
$ cd helpmepassassignmentplease
```

Deploy your changes

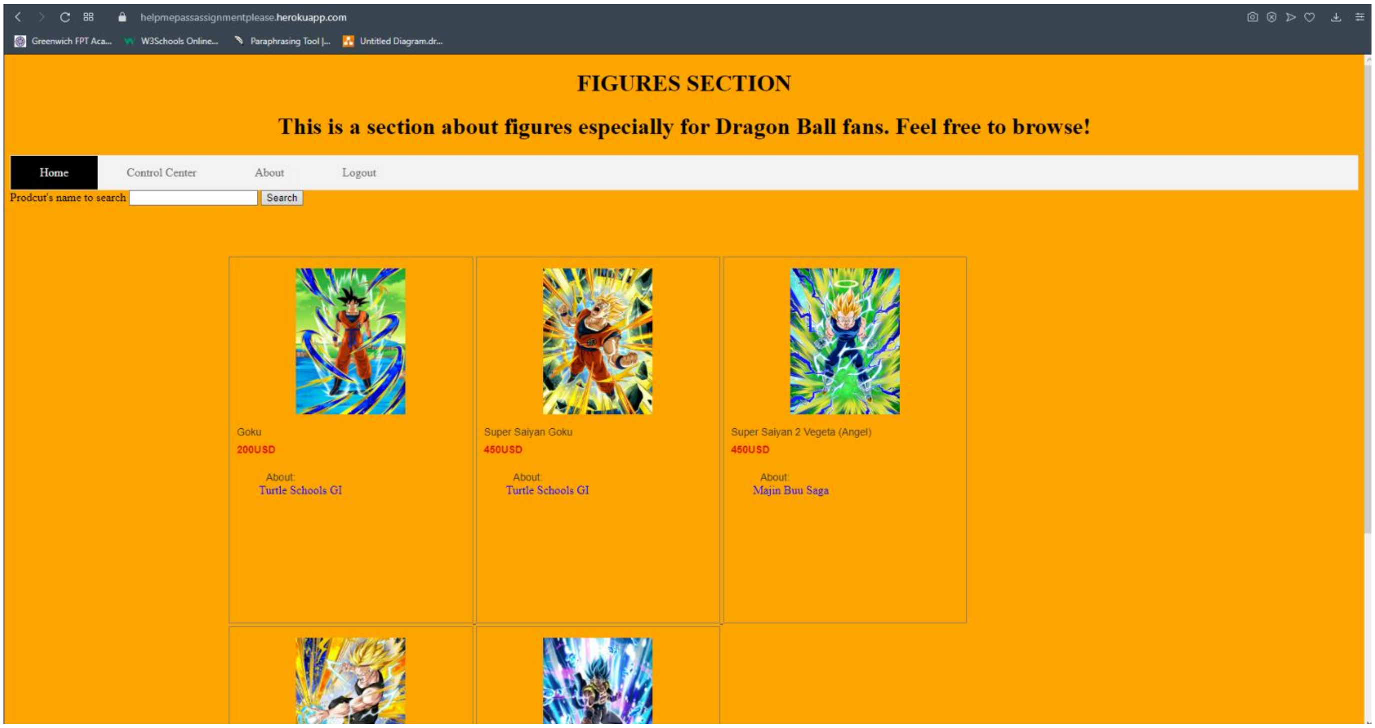
Make some changes to the code you just cloned and deploy them to Heroku using Git.

Next, to deploy my code to Heroku, I have to enter these command on the terminal of my IDE:



```
$ git add .
$ git commit -am "make it better"
$ git push heroku master
```

My Heroku address should be: https://helpmepassassignmentplease.herokuapp.com



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III. Analysis of the most common problems and security issues of a cloud computing platform and how to overcome these issues.

III.1 Security risks.

When it comes to cloud computing, there are some sections of risk that's can be compromise and must be secure. Because if don't, it can be resulted in a potential attack vector or source of failure. Based on (Worlanyo, 2015), there are five risks that can be considered dangerous. Explained in the diagram below:

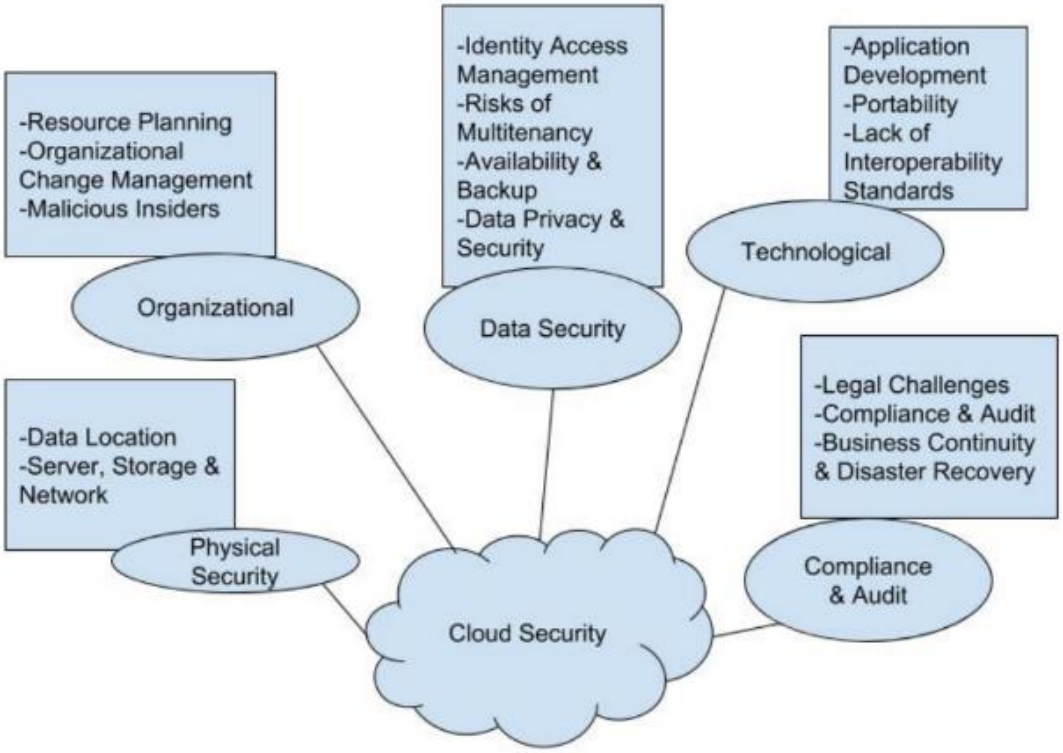

Figure 2 - Cloud Provider Risk Categories and Subcategories [Latif14]

Figure 1:Security Risk Considerations (Worlanyo, 2015)

The five risks are: organizational risk, data security risk, technological risk, physical security risk, compliance & audit risk.

III.1.1 Organizational risk

Organizational risk explained as if a cloud-service provider (CSP) goes out of business or get acquired by another entity, this may leave a negative impact on their CSP since any Service Level Agreement (SLA) they had may have changed and they would have to migrate to another CSP that more aligns to their need. (Worlanyo, 2015). Moreover, threat of malicious insiders in the organization could be possible, this can do harm using data provided by their CSC (Cloud Service Customer).

III.1.2 Data Security risk

There are many components of data security risk that can be taken into consideration that is privacy, confidentiality, integrity and availability.

- Privacy: one of the issues that needed to deal with in the cloud and in network security in general. Without privacy, personal information's and identity of a CSC can by revealed to unauthorized users. This can be a big problem especially when a CSC have sensitive data.
- Confidentiality: this component is related to data privacy since this ensuring that data belongs to a CSC. In public clouds, the CSP are responsible for securing CSC data. This is kind of difficult because of multitenancy since multiple customer have access to same hardware CSC store it's data. This can be the base for attackers to have full access to the data to the host.
- Integrity: this refer to the confidence of that data stored in the cloud is not alter in any way by unauthorized users' parties when it's being retrieved (Worlanyo, 2015). This issue can be a worse if any third-party can easily obtained access to data in transit or data in storage.
- Availability: if CSC can't access to their data, it's mostly because of malicious attacks, mainly denial-of-service, they are used to deny the availability of data. Making CSC access to their data are denied.

III.1.3 Technological Risks

These risk are mainly caused by hardware failure, technologies and services provided by the CSP. In the public cloud, with its multitenancy functions, these include resources sharing isolation problem, and risk are related to changing CSPs (Worlanyo, 2015).

III.1.4 Physical Security Risks

This risk occurs by lack of appropriate infrastructure operation includes staff training, physical location security and network firewalls. This can cause unauthorized on-site access of CSC data. Even firewalls and encryption cannot protect against physical data (Worlanyo, 2015).

III.1.5 Compliance & Audit risk.

These risk are related to the laws such as lack of jurisdiction information, charges in jurisdiction, illegal clauses, etc.

IV. Risk Assessments

In the last section, we have discuss some potential risks that could happen, now we will discuss the way to assess them:

IV.1 Organizational risk

To assess this risk. First, a strict legal constraint in contacts when hiring staff can help prevent malicious insiders. In addition, a comprehensive assessment of a CSP by a third party, a good security breach notification process will also help prevent this risk.

IV.2 Data Security risk

Based on (Worlanyo, 2015), there are two methods used to ensure the data security:

Authentication:

- Authentication is a form of access control. this can be done by either CSP or outsourced to third party specialist. Some method include the IBHCC (identity-based hierarchical for cloud computing) and the SAP (SSH Authentication protocol). Other method for authentication includes OpenID, OAuth, SAML, XACML, etc.

Encryption: other than authentication, encryption techniques can be used to secure data as well. Some method of encryption include:

- Caesar Cipher: a classical substitution, this cipher works by replacing the letter of alphabet with a three different letters. For example, “ALPHA” will be converted to “COXOX”. Only one drawback of this cipher is the fact that it can be easily be brute forced since it only have 25 different key options and it’s kind of outdate nowadays.
- Secure Socket Layer (SSL): SSL is a 128-bit encryption used for managing security of a message transmission on the internet and it uses public and private keys encryption system.
- RSA: a cryptographic algorithm whose encryption key is public, and it differs from the decryption key which it kept secret. RSA is based on the fact that finding the factors of an integer is hard. It is one of the more commonly used encryption algorithm nowadays (Worlanyo, 2015).

IV.3 Technological Risks

The following methods that need to be look at:

- Virtualized defense: the following structure that CSP should use: a hierarchy based overlay servers of DHT (Distribute hash table) with a specific task performed in each layers. The highest layer will taking care of various attacks while the lowest layer will deal with reputation aggregation and probing colluders.
- Secure Virtualization: CSP can use systems like ACP (Advance Cloud Protection) ensure that security of guest virtual machines and of distributed computing middleware.
- Trust model for security and interaction: three separated domain for provider and users which each come with a special trust agent should be considered. In addition, different trust strategies for service provider and customers should be considered as well.

IV.4 Physical Security risk

This can be prevented by having strong physical deterrents in places such as keycard access, biometric scans. This will help restrict access to sensitive locations in the data center.

IV.5 Compliance & Audit risk.

Both CSC and CSP needs to understand regulatory and legal obligations and make sure that any contact can meet these obligations. For CSP, they should also ensure that the capabilities of being discovered do not compromise and the privacy of data.