Temasek Polytechnic
School of Informatics & IT

Microservices (CIT2C21)
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Project Part 1
(Proposal)

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Purpose

Write down the problem statement.

Think about the problems (efficiency problems, etc.) that your solution intends to solve.
Think about existing solutions/problem that your system can improve or replace.

Problem Statement: Animal shelter are at risk of closing.

Up till now, pet abandonment remains an issue in Singapore and all around the world. Many innocent and harmless loving animals are being subjected to this terrible fate every year. Over the past few years, there has been a surge of cat abandonments. According to the Agri-Food and Veterinary (AVA) there were 57 cat abandonment cases last year up from 21 the year before and just nine in 2016. Furthermore, it has been reported that hundreds of cats and dogs might go homeless as Singapore's animal shelter faces risk of closing. An example is Pets Villa which is a non-profit shelter in Singapore run by Animal Lovers League. Pets Vila is a "no kill" shelter meaning they do not euthanize animals that are healthy or treatable despite old age or space constraint. Running an animal shelter can be quite costly it cost $9000 monthly which covers facility, food, and veterinary services. Due to the high maintenance cost of running an animal shelter sadly, it has resulted in Pets Vila with a debt of $48,000 (three months' rent) and they are currently in danger of ceasing their operation. To prevent themselves from closing, Animals Lovers League asked for funds through their Instagram page to help Pets Vila.

https://www.nuss.org.sg/graduate-digest/the-wild-truth-behind-animal-shelters
https://mothership.sg/2019/06/pets-villa-animal-lovers-league-shelter/
https://www.todayonline.com/singapore/surge-abandoned-cats-microchipping-answer

Provide the purpose of your proposed web application and why it is needed.

Describe with a few paragraphs, the overall objective of your solution.

The purpose of this website is to help animal shelter to avert them from closing. This website is a platform where users and especially animal lovers can use to sponsor or donate to help keep the animal shelter running. Many independent animal shelters feed off donations and sponsorship to ease their financial burdens.

Compared to other animal shelter website, one unique feature that this website offers are the selling pet care products and merchandise to achieve a more sustainable living. The earnings will then be used for funding purposes.

Key Features and Users of the web application

What are the possible user scenarios for your solution? Specify potential users of your application.
Describe the user scenarios that your solution will have, i.e. how will the users use the application under different scenarios?

Scenario #1: Adopters

The potential user will be targeted towards users who are looking to adopt a pet. The pet adopter will then use this website and look at the potential pets that are available for adoption. The adopter also will be given an opportunity to book a day with their potential pets so that the user and the pets can interact with one another prior to the official adoptions. The website will also list the adoption procedure this is to ensure that the pets find the most suitable home for them and the adopter will cherish them.

Scenario #2: Sponsor / donners

The 2nd potential user will be sponsors. Or donors Donations/Sponsors is vital to keeping pet shelter running. The donations or sponsorship amount received will be used to cover the expenses incurred in the shelter. It will be mainly used for medical expenses, food, and monthly rental fees for the kennels. Hence, through this website users are able to help the pet shelter by donating. Two option will be available for user to choose from. User can either do a one-time donation or monthly donations.

Scenario #3: pet owners

The 3rd potential users is pet owners will be targeted towards pet owners. To raise even more funds, the website will also feature pet care products where it features all the essentials pet care items. Pet owners will be able to use this website to purchase items like food, toys and even accessories.

Scenario #4: Admin

The admin will be granted full access in this website. The admin will mainly be doing updates and deletes of the pets available for adoption. In addition, admin will also be able to update the products whether it is available or out of stock.

Describe the key features of your web application.
From the user scenarios, come up with a list of the features and descriptions your application will have.

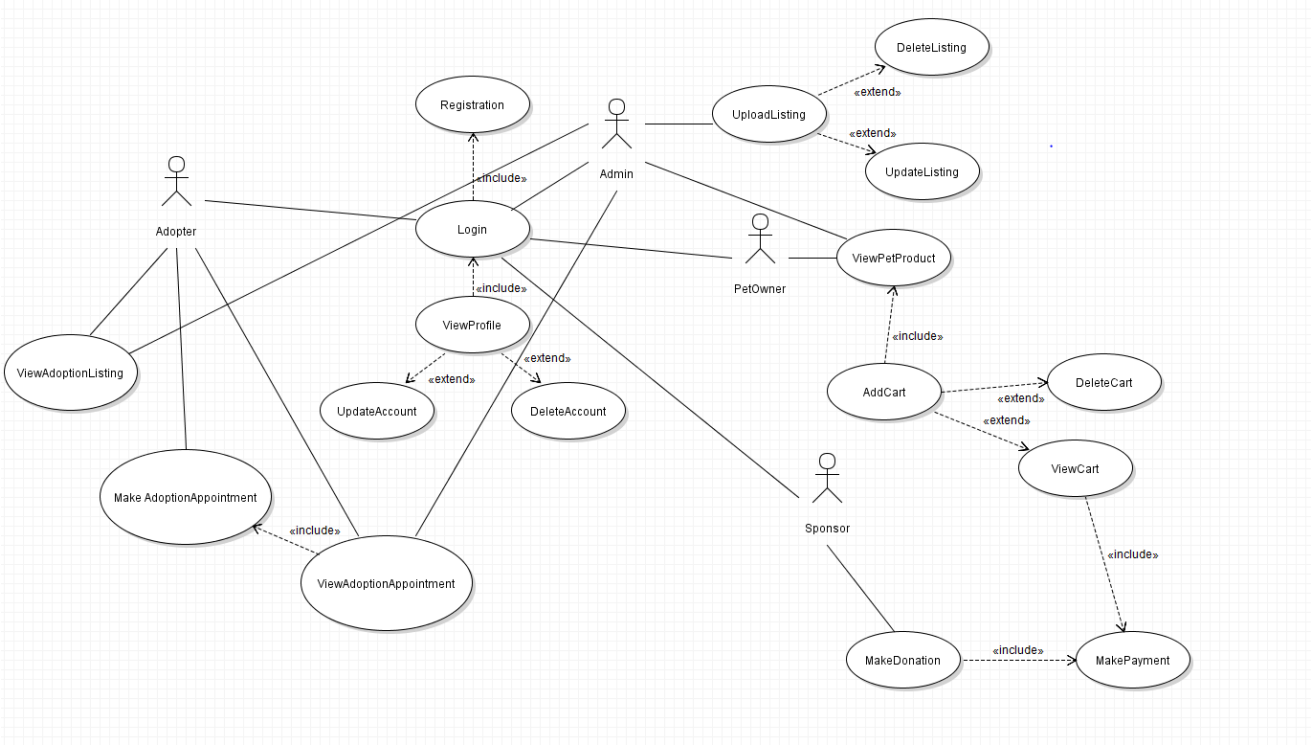
(Visual aids such as use case diagram will be useful)
Key features

- **Account (applicable to all types of users and admin)**
    - **Login –** User has to login before they can get access to the features of the websites such as adding items to their cart booking an appointment ect. User will be prompted to enter their login details. The system will then verify that this user exist, upon verification user will then be directed to the home page.
    - **Registration –** This is for new users of the website. Users will be asked to enter all the required user details to register their details into the system. All the entered details will then be saved into the database.
    - **Update –** This function will be used for users that wish to update their particulars like mobile number ect.
    - **Delete –** This function will be used to remove user account.
    - **Role authorization –** To distinguish whether the user login is an admin or a regular user. Only admin will be granted full access of the website and able to perform certain features like uploading new listing for pets available for adoption or products for sales.
- **Listing pets available for adoption and listing of Products for sales (Applicable to admin)**
    - **Upload new listing** -only admins can upload a product listing or adoption listing.
    - **Edit Listing-**This function allows admins to edit their listing. For example editing the product pricing.
    - **Delete Listing –** This function allows admin to delete their listing if an animal is successfully adopted or the product is currently out of stock.
- **Add to cart (user: pet owner)**
    - **Add products into their cart** -This function will be used for user to add products into their cart. The cart must have a minimum of 1 product added to proceed with the checkout page.
    - **Delete products in the cart –** This function will be used if the user would like to delete the selected product inside their cart.

- **Retrieving of products in the cart page** – This function is to view what are the products added into the cart.

- **Book an appointment (user: potential adopter)**
  - **Create an appointment** – Potential adopter would have to book in advance prior to meeting the animals in the shelter.
  - **View appointment**- Potential adopter would be able to view their appointments
- **Sponsorship/Donors** – This function is implemented for anyone who wish sponsor/donors the animal shelter or a specific animal.
- **Additional Features**
  - **Favourites –** For users who wish to save a specific animal or products to view later
  - **Checkout and payment page –** implementation of stripe payment.
  - **Filter -** Filter by category/breeds.

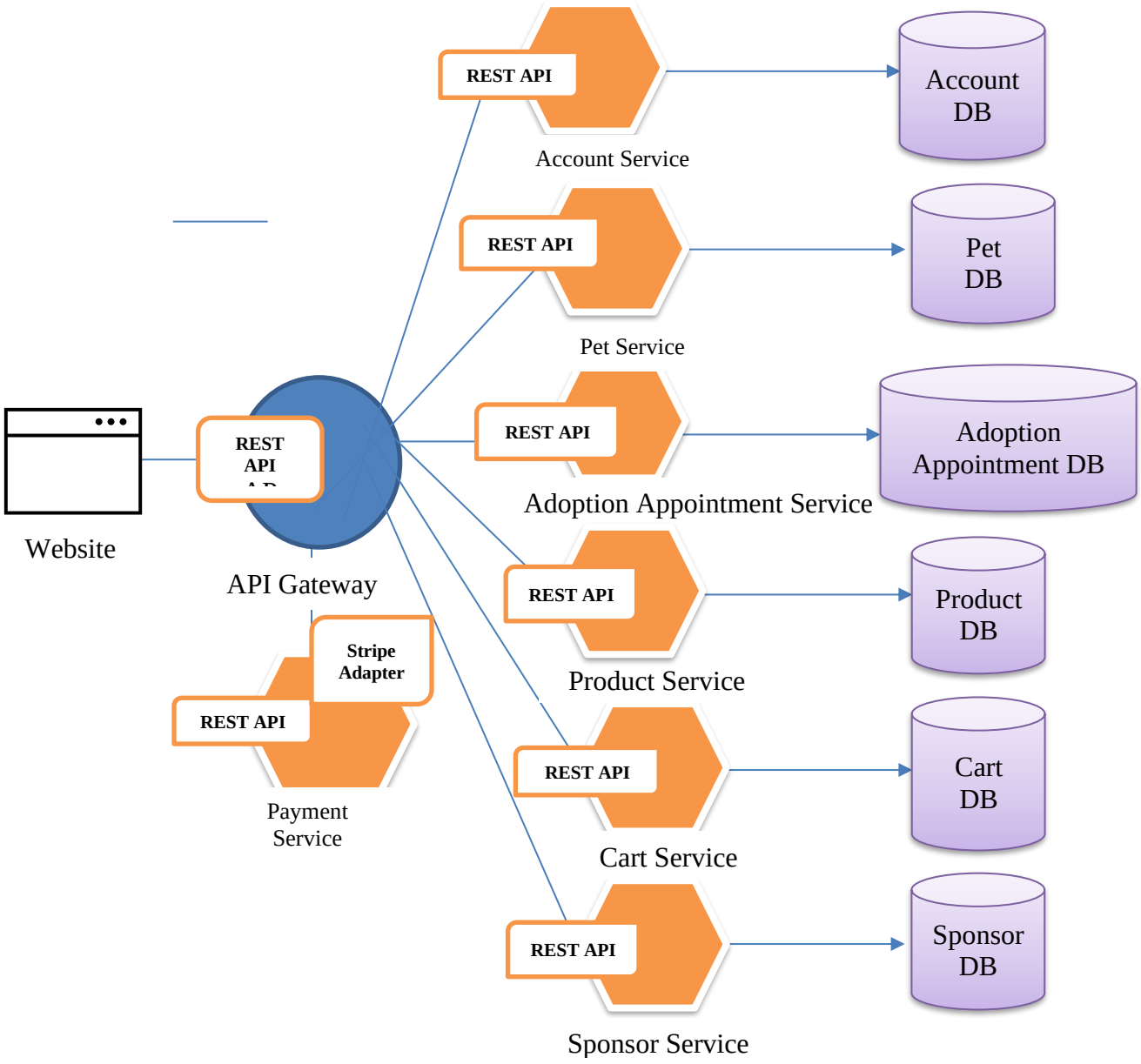
Use Case Diagram



Microservices Architectural Design

Draw your proposed microservices architecture diagram.
Using the microservices architecture diagram, describe each services and how each loosely coupled microservices link to each other.

Example:
https://www.nginx.com/wp-content/uploads/2016/04/Richardson-microservices-part1-2_microservices-architecture.png
https://microservices.io/i/Microservice_Architecture.png



Description

Account Service

- Use to handle all account related services such as registration,login,update and delete.

Pet Service

- Use to handle pet related services such as creating a new adopting pet listing, updating and deleting of listing.

AdoptionAppointmentService

- Use to handle adoption appointment related services.
- For function like MakeAdoptionAppointment, need to check the Account service to ensure that the user is qualified to adopt a pet before it can call the AdoptionAppointmentService.
- Likewise before adoption need to check with the Pet Service whether that particular pet is available for adoption before it is able to call AdoptionAppointmentService.

ProductService

- Use to handle product related services such as uploading product, edit and delete product listing.

CartServices

- Use to handle cart related services such as add to cart , view cart details and delete cart.
- In order to add to cart function to work, need to communicate with the Account service to ensure that the user is login to before it is able to call the Cart Services.
- Likewise same goes to ViewCartDetails function and DeleteCart need to communicate with Account Service.

Sponsor Service

- Use to handle Sponsor related services such as makedonation
- To makeDonation, need to check with the Account Service to ensure that user exist and login before it calls the Sponsor service.

Payment Service

- Use to handle payment services via Stripe

- The payment service will only be called when the cart/sponsor services have been called. This is to ensure that there are items in the cart before proceeding to makepayment.

API Documentation

Design and provide a set of service contracts (API definition) that define the usage of each microservices.

Example:

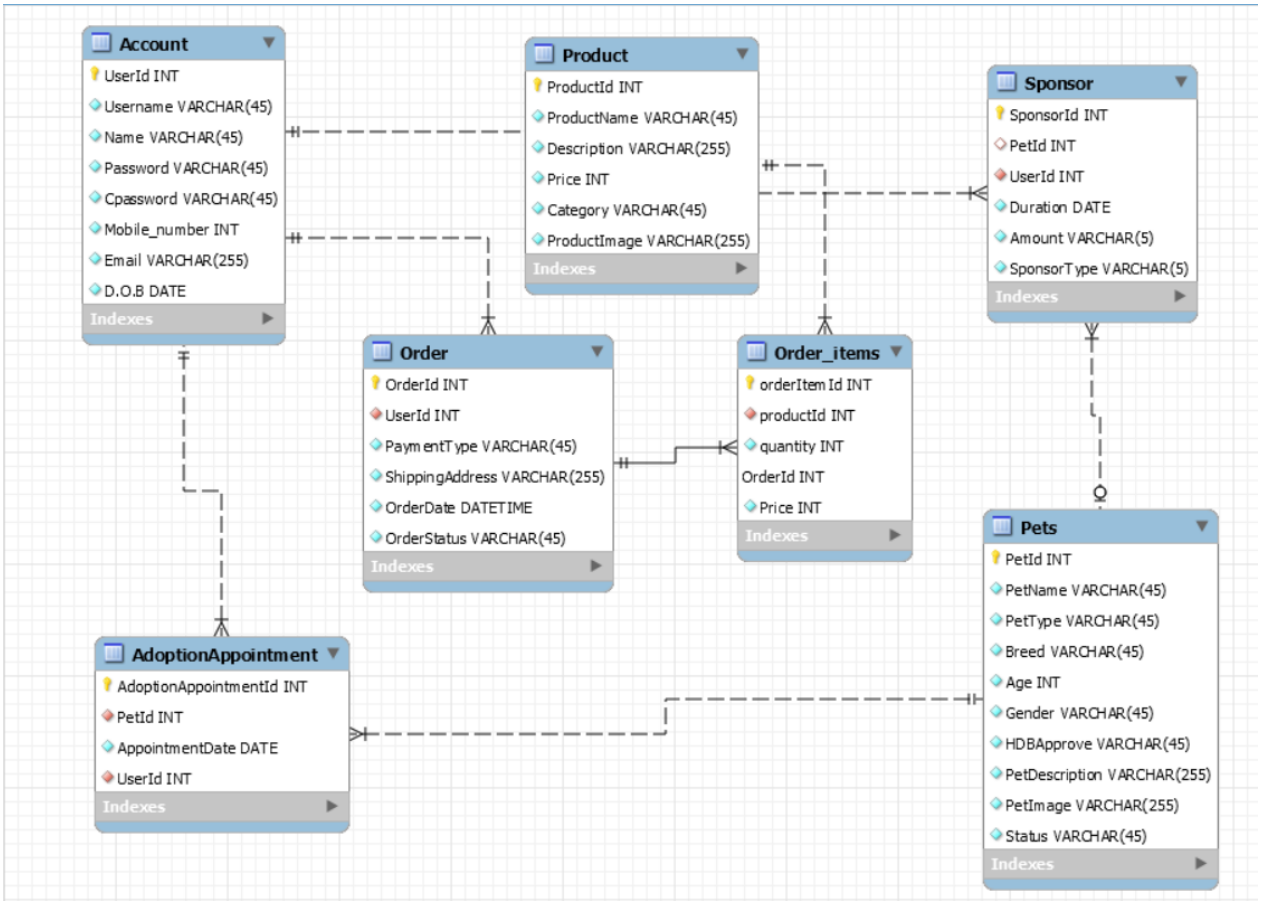
Service Name	HTTP method	Relative URL	Action
AccountService	GET	/api/accounts	Get all accounts
AccountService	GET	/api/accounts/{id}	Get an account by ID
AccountService	POST	/api/accounts	Create a new account
AccountService	PUT	/api/accounts/{id}	Update an account by ID
AccountService	DELETE	/api/accounts/{id}	Delete an account by ID
ProductService	GET	/api/products	Get all products
ProductService	GET	/api/products/{id}	Get individual product by ID
ProductService	POST	/api/products	Create a new product listing
ProductService	PUT	/api/products/{id}	Update a product by ID
ProductService	DELETE	/api/products/{id}	Delete a product by ID
ProductService	GET	/api/products/category/{category}	Get products based on category
CartService	POST	/api/carts	Add products into cart
CartService	GET	/api/carts/{Account_ID}	Get all cart details based on account ID
CartService	Delete	/api/carts/{id}	Delete cart based on cart ID

CartService	UPDATE	/api/carts{id}	Update cart based on cart ID
PetService	GET	/api/pets	Get all pets available for adoption,sponsor
PetService	GET	/api/pets{id}	Get an individual pet based on ID
PetService	POST	/api/pets	Create a new listing for adoption,sponsor
PetService	PUT	/api/pets{id}	Update a pet listing by ID
PetService	DELETE	/api/pets{id}	Delete an individual pet based on ID
PetService	GET	/api/pets/pettype/{pettype}	Get pets based on pet type
AdoptionAppointmentService	GET	/api/adoptionappointments	Get all appointments
AdoptionAppointmentService	GET	/api/adoptionappointment/{account_id}	Get all appointments based on account ID
AdoptionAppointmentService	DELETE	/api/adoptionappointment/{account_id}	Delete appointment based on account ID
SponsorService	GET	/api/sponsor	Get All sponsor service
SponsorService	GET	/api/sponsor/{account_ID}	Get all sponsor service based on account ID
SponsorService	POST	/api/sponsor/{account_ID}	Create a new sponsor

			service based on account ID
SponsorService	GET	/api/sponsor/petID	Sponsor an individual Pet by PetID
PaymentService	GET	/api/carts/{account_id}/payments	Get Payment details based on account Id from cart service

Database Design Diagram

Database schema diagram (includes: table name, column and type, primary key, foreign key (if any))
Data Dictionary



DATA Dictionary

Table Name: Account

Description : This table consist of account details of an user

Field Name	Data Type	Data Format	Field Size	PK/FK	Description	Example
UserId	Integer	NNNNNNNN	-	PK	Unique number and not null for UserId	10000001
Username	VARCHAR	NNNNNNNN	45	-	Unique and not null for username	Joyce123
Name	VARCHAR	NNNNNNNN	45	-	Name of user	Joyce
Password	VARCHAR	NNNNNNNN	45	-	User's password	123321zz
Cpassword	VARCHAR	NNNNNNNN	45	-	User's Confirm password	123321zz
Mobile_number	INT	NNNNNNNN	8	-	Unique and not null for User's mobile number	87654321
Email	VARCHAR	NNNNNNNN	255	-	Unique and not null for User's Email Address	Email@gmail.com
D.O.B	DATE	DD/MM/YYYY		-	Date of birth of user	01/01/2001

Table Name: Product

Description : This table consists of product details

Field Name	Data Type	Data Format	Field Size	PK/FK	Description	Example
ProductId	Integer	NNNNNNNN	-	PK	Unique number and not null for ProductId	10000001
ProductName	VARCHAR	NNNNNNNN	255	-	Unique Product name	Bucklebone Dog Collar
Description	VARCHAR	NNNNNNNN	255	-	Product Description	All seams are sewn (not welded) for maximum strength

Price	INT	$NNN	-	-	Price of the product	$10
Category	VARCHAR	NNNNNNN	45	-	Category of the product	Accessories/Food
ProductImage	VARCHAR	NNNNNNN	255	-	Image of the product	Documents/productimage/img.jpg

Table Name: Order

Description : Use to generate an orderId of the user order

Field Name	Data Type	Data Format	Field Size	PK/FK	Description	Example
OrderId	INT	NNNNNNNN	-	PK	Unique number and not null for OrderID	10000001
UserID	INT	NNNNNNNN	-	FK	Foreign Key to UserID. From account table To which user placed the order	10000001
PaymentType	VARCHAR	NNNNNNNN	-	-	Payment mode	VISA
ShippingAddress	VARCHAR	NNNNNNNN	255	-	Address for the products to be delivered to	Hougang blk 123
OrderDate	DATETIME	DD/MM/YYYY HH:MM:SS	-	-	Order created	14/09/2020 10:12:20
OrderStatus	VARCHAR	NNNNNNNN	45	-	Order status	Shipping

Table: Order_items

Description : The purpose of this table is acts like a receipt. Foreign Key OrderId referencing from OrderId from the Order table thus it will retrieve all that table details. ProductId will foreign key to ProductId from the product table.

Field Name	Data Type	Data Format	Field Size	PK/FK	Description	Example
OrderItemId	INT	NNNNNNNN	-	PK	Primary Key for OrderItemID	10000001
ProductId	INT	NNNNNNNN	-	FK	Foreign Key to ProductId from the product Table	10000001

OrderId	INT	NNNNNNNN	-	PK and FK	Foreign key to OrderId from Order Table	10000001
Quantity	INT	NNNNNNNN	-	-	Quantity of the selected product	2
Price	INT	$NNNNNNNN	-	-	Price of the product	$10

Table: Sponsor

Description : This table consist details of the sponsor

Field Name	Data Type	Data Format	Field Size	PK/FK	Description	Example
SponsorId	INT	NNNNNNNN	-	PK	Primary key for SponsorId	10000001
PetId	INT	NNNNNNNN	-	FK	Foreign key to PetId from the Pet Table	10000001
UserId	INT	NNNNNNNN	-	FK	Foreign key to UserId from Account table.	10000001
Duration	DATE	DD/MM/YYYY	-	-	Duration of the sponsorship	5/11/2020 – 1/11/2021
Amount	VARCHAR	NNNNNNNN	5	-	Amount donated	$100
SponsorType	VARCHAR	NNNNNNNN	45	-	Type of sponsorship	5 months

Table: Pet

Description : This table consist details of the pet

Field Name	Data Type	Data Format	Field Size	PK/FK	Description	Example
PetId	INT	NNNNNNNN	-	PK	Primary Key for PetId	10000001
PetName	VARCHAR	NNNNNNNN	45	-	Name of pet	Kaiji

PetType	VARCHAR	NNNNNNNN	45	-	Pet type	Dog/Cat
Breed	VARCHAR	NNNNNNNN	45	-	Breed of the pet	Beagle
Age	INT	NNN	-	-	Age of the pet	2
Gender	VARCHAR	NNNNNNNN	45	-	Gender of the pet	Female
HDBApprove	VARCHAR	NNNNNNNN	45	-	HDB approve	Yes/No
PetDescription	VARCHAR	NNNNNNNN	255	-	Description of the pet	Shy
PetImage	VARCHAR	NNNNNNNN	255	-	Image of the pet	Documents/pet/ image.jpg
Status	VARCHAR	NNNNNNNN	45	-	Status of the pet	Available

Table: AdoptionAppointment
Description : This table consist of appointment details

Field Name	**Data Type**	**Data Format**	**Field Size**	**PK/FK**	**Description**	**Example**
AdoptionAppointmentId	INT	NNNNNNNN	-	PK	Primary Key for AdoptionAppointmentId	10000001
PetId	INT	NNNNNNNN	-	FK	Foreign Key to PetId from Pet Table	10000001
AppointmentDate	DATE	Dd/mm/yyyy	-	-	Date of the appointment	5/11/2020
UserId	INT	NNNNNNNN	-	-	Foreign Key to UserId from User Table	10000001