E-Waste Management

Step Towards a Clean Earth

E-Waste Management System

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INTRODUCTION

➢ **What is E-Waste ?**

E-waste means electrical and electronic equipment, whole or in part discarded as waste by the consumer or bulk consumer as well as rejects from manufacturing, refurbishment and repair processes.

➢ **Type of E-Waste**

➢ **E-Waste and Environmental Effect**

➢ **E-Waste Management System**

OUR OBJECTIVE

Our main objectives are given below: -

- ➢ Focus on E-Waste Only
- ➢ Location Tracking
- ➢ Coverage in Rural Areas
- ➢ Reward in exchange of E-Waste
- ➢ Ease of Waste Pick up
- ➢ Educating The User

MOTIVATION OF THE PROJECT

➢ **E-waste is the "fastest growing waste stream in the world".**

➢ **In 2018 an estimated 50 million tons of e-waste was reported, thus the name "Tsunami of E-waste" given by UN.**

➢ **In 2019 an enormous volume of e-waste(53.6 Metric ton with 7.3kg per capita average) was generated globally.**

➢ **The Confederation of Indian Industry (CII) organized a virtual conference on "E-Waste Management in India 2020".**
https://www.cii.in/

➢ *India ranks fifth amongst the largest e-waste producing countries.*

Application Name	Features	Technology Used	Limitations
[1] Praan Vaayu e-waste management (Author – Arth Technology - India):	➤ Sign in process ➤ Collection Procedure ➤ Form Fill up for new customer ➤ Access to Collection History	➤ Android Studio ➤ Kotlin ➤ Xml	➤ No OTP Verification ➤ No Location Tracking mechanism. ➤ No support page. ➤ Less E waste options
[2] UZED – Recycle plastic, e-waste (Rapidue Technologies Pvt. Ltd.):	➤ Multi-City feature ➤ Impact and Reward Options ➤ Categories of E-waste ➤ Customer Support	➤ Android Studio ➤ Java / kotlin ➤ xml	➤ Availability ➤ No Location tracking ➤ No doorstep service.
[3] i899 Recycling – E-Waste Recycle (Spas Group of Companies):	➤ E-Waste Pickup Service ➤ Barcode-Scanning Feature ➤ Reward tracking System ➤ Step by step packaging guide	➤ Android Studio ➤ Java / Kotlin ➤ Xml ➤ Firebase Data Base	➤ Privacy Issue
[4] Zolopik E-Waste Recycling (Author – Zolopik E-Waste Recycling Trivendent Technologies Pvt. Ltd.):	➤ Web Application ➤ E-waste selling option. ➤ Coverage in Mega-city. ➤ Customer Support	➤ HTML5, CSS, JavaScript ➤ PHP	➤ No sign-up page ➤ Website not Dynamic ➤ Email-id is mandatory ➤ No Category-Wise Division.

SCOPE OF THE WORK

On 19th May, 2022, Ministry of Environment, Forest and Climate Chane, Govt. of India published a draft rule, namely E-waste (Management) Rules.
Various Scope of the Project are given below –

➢ **Business Scope**

➢ **Environment Friendly**

➢ **Streamlining Waste Management Operations with Software**

➢ **Enhanced Data Management and Reporting**

➢ **Improved Efficiency and Cost Savings**

WORKFLOW DIAGRAM
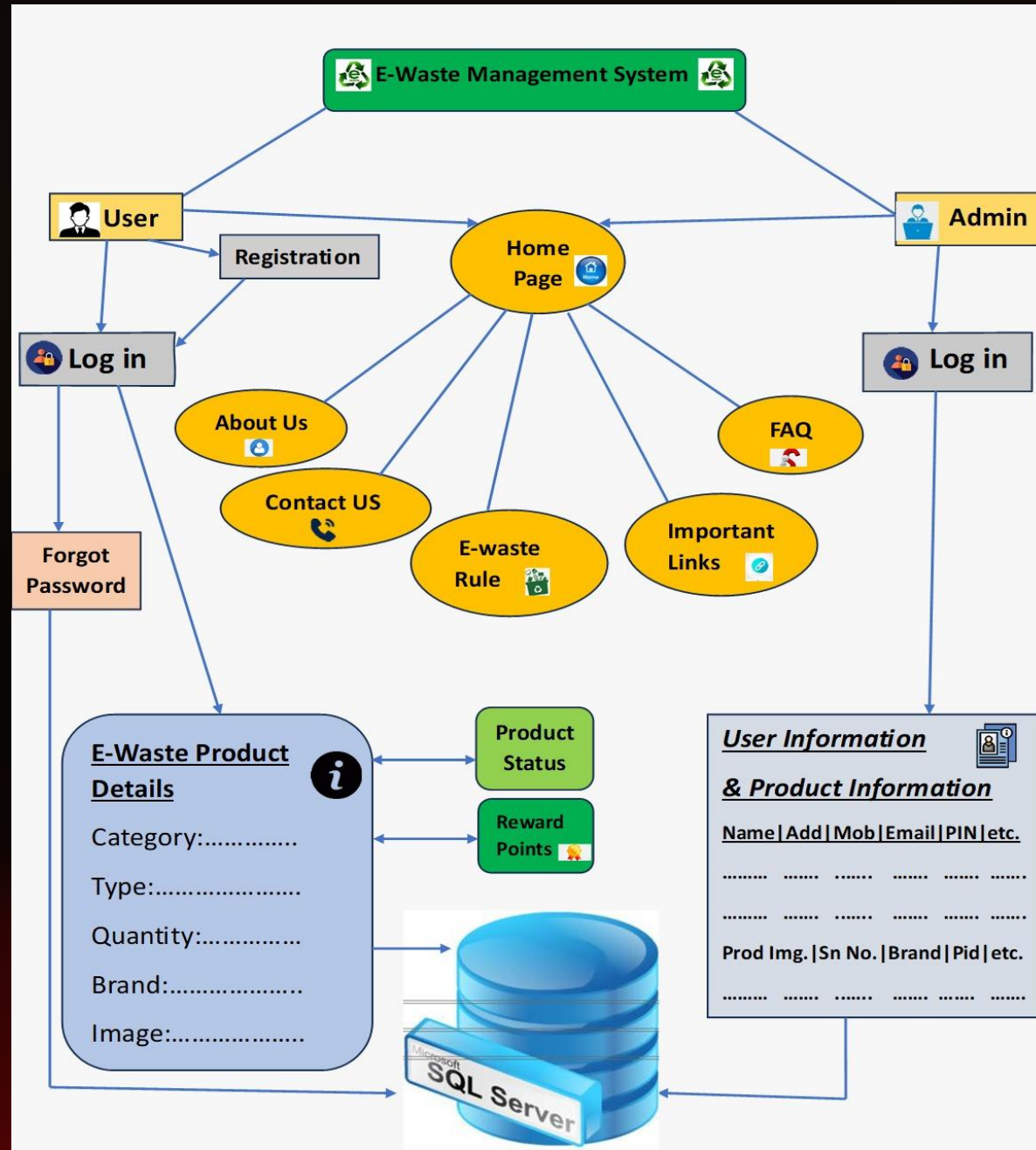
E-R Diagram:

Data Flow Diagram:

Level-0 DFD:
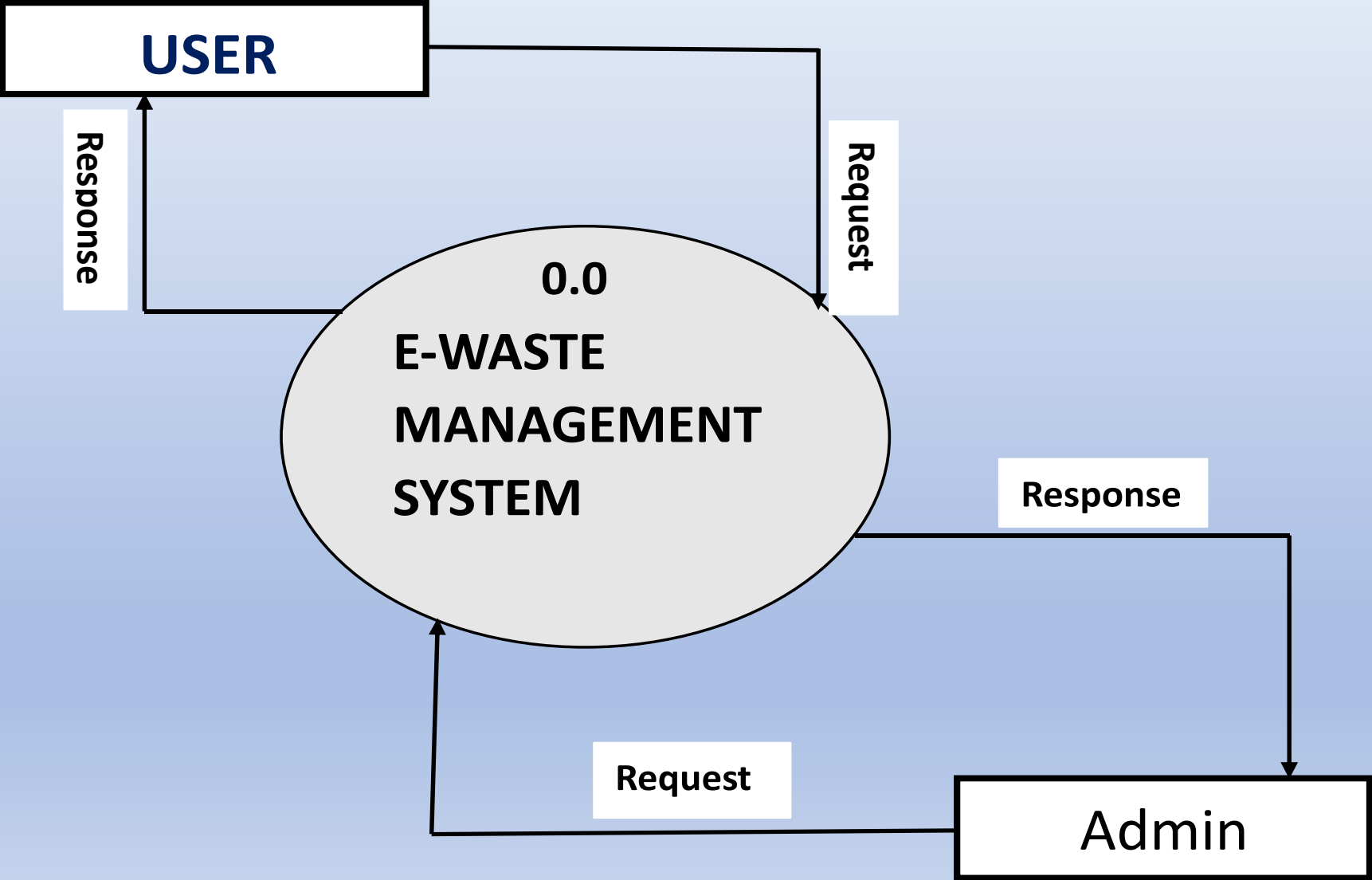
User view:

User/Donor

Log in Request

User Id & Password

2.0
Process:
Log in

Product

Information

2.1
Process:
Product Details

Response

Product ID

Data-flow

Data-flow

Product-Data

Data-flow

2.2
Process:
Track

Input Product ID

Response

Product Status

2.3
Process:
Reward

Request

Response

Reward Points
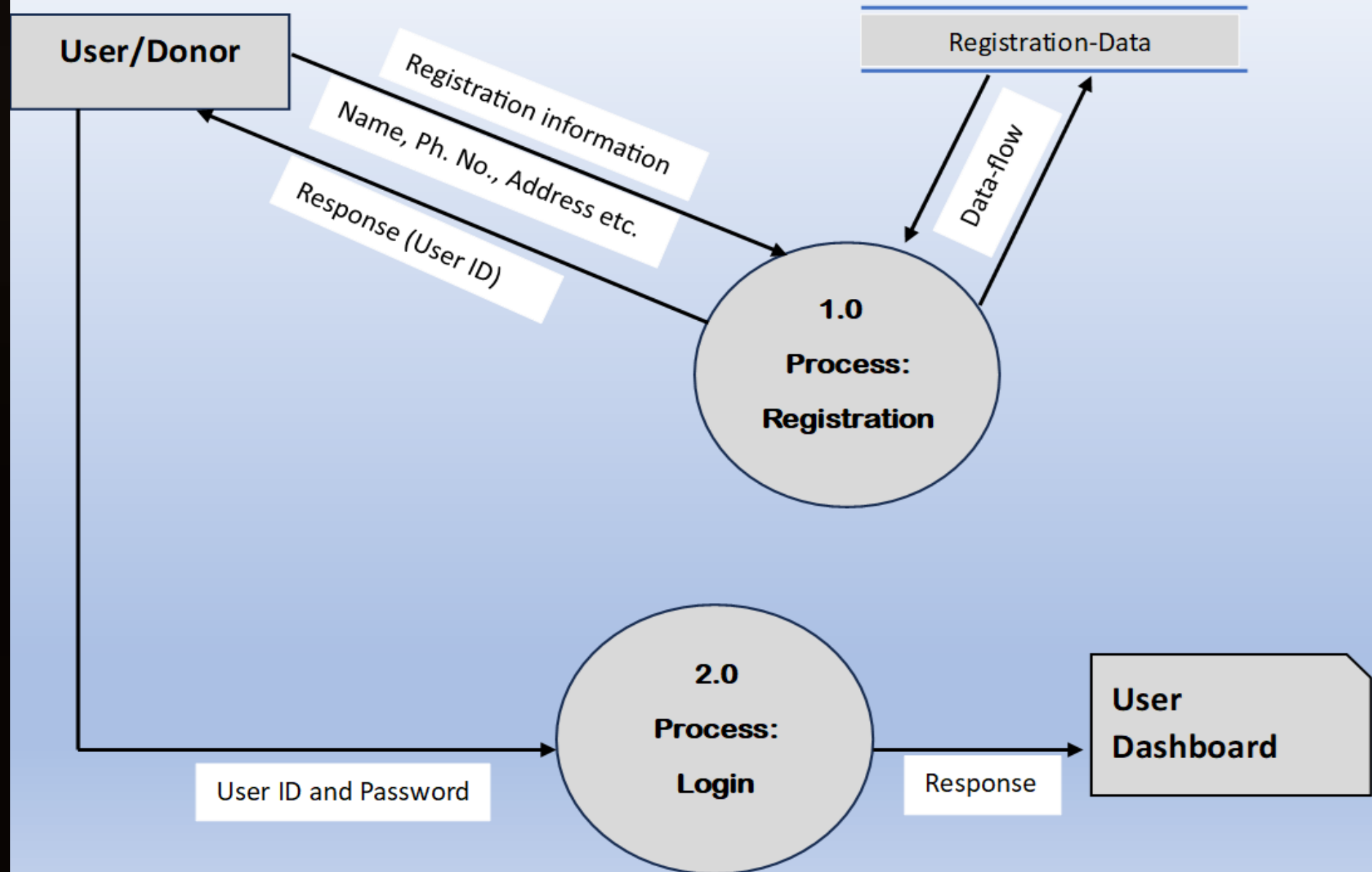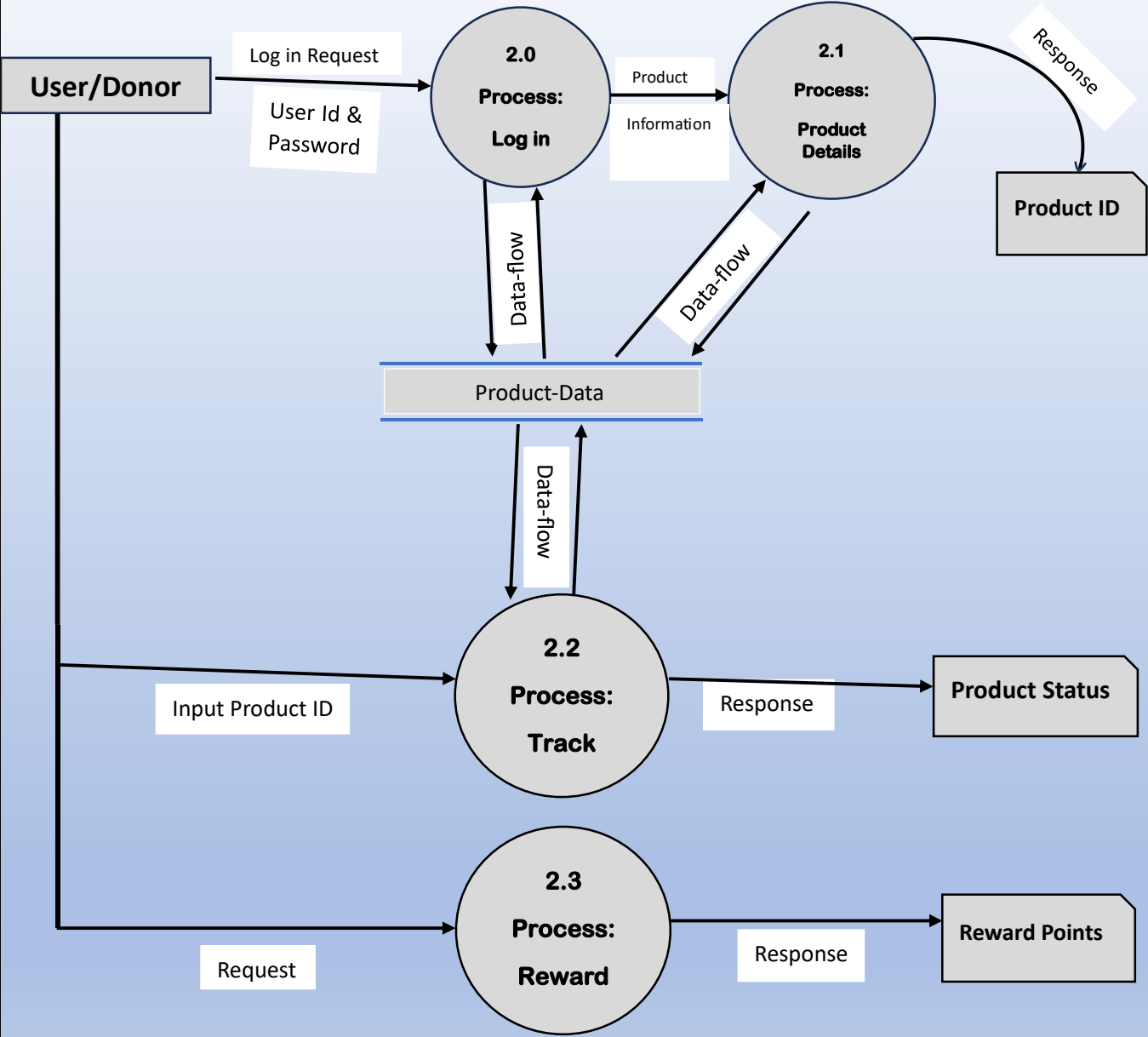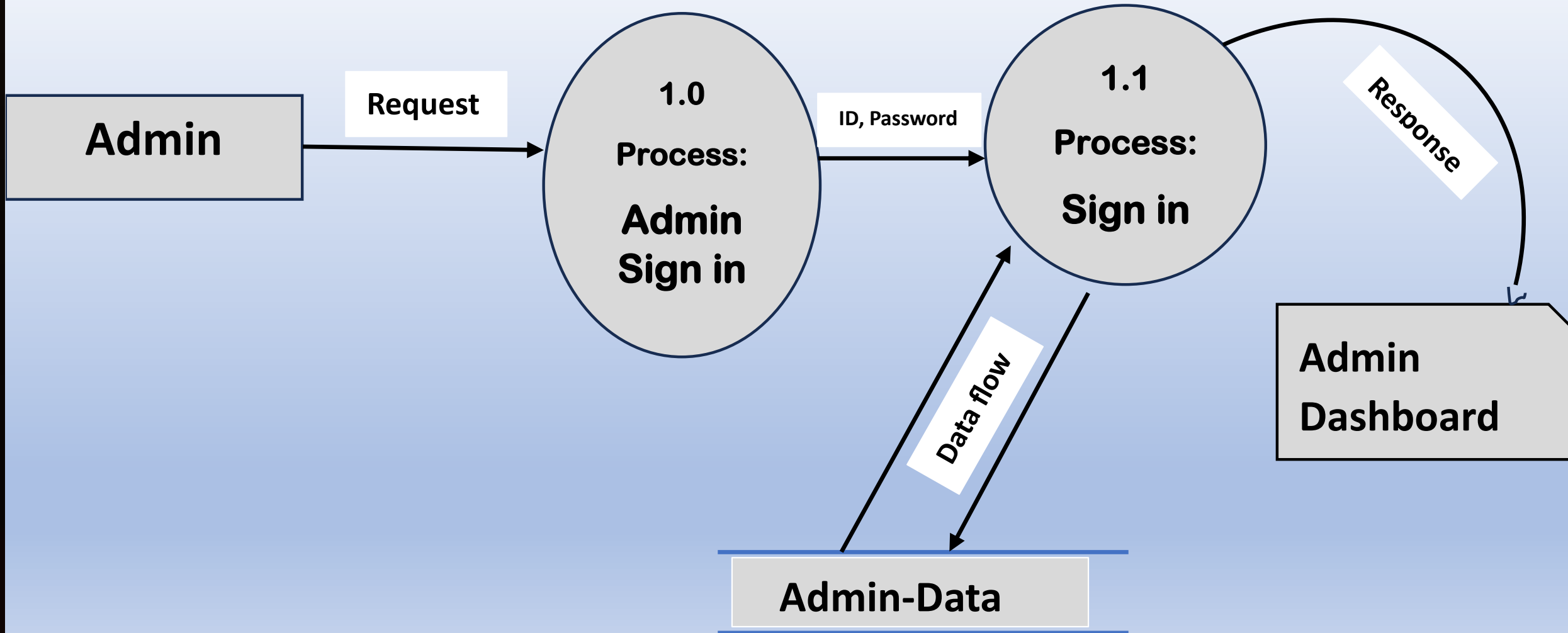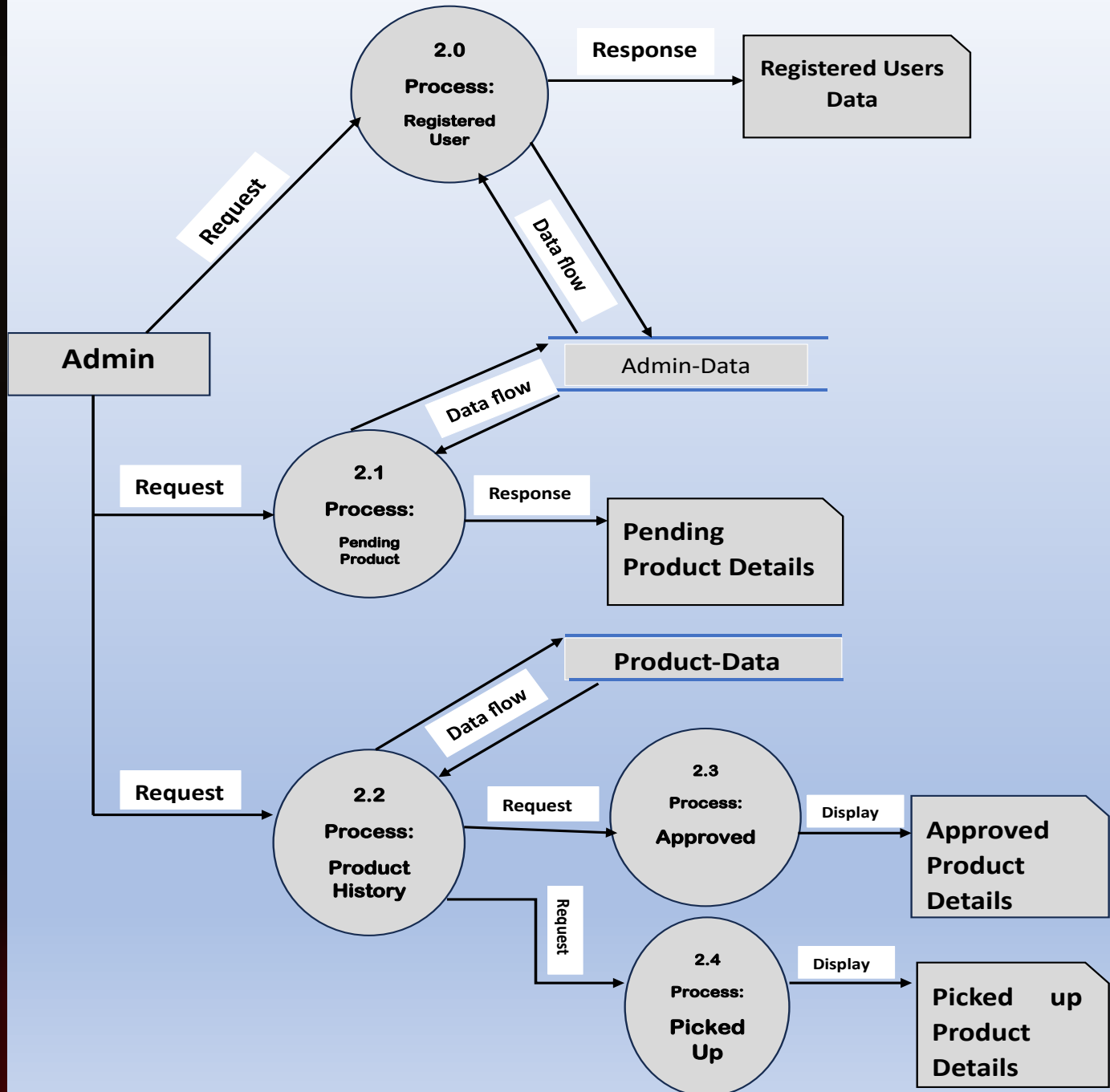
DATA TABLE AND ATTRIBUTES

dbo.Question [Data] 📌 ✕

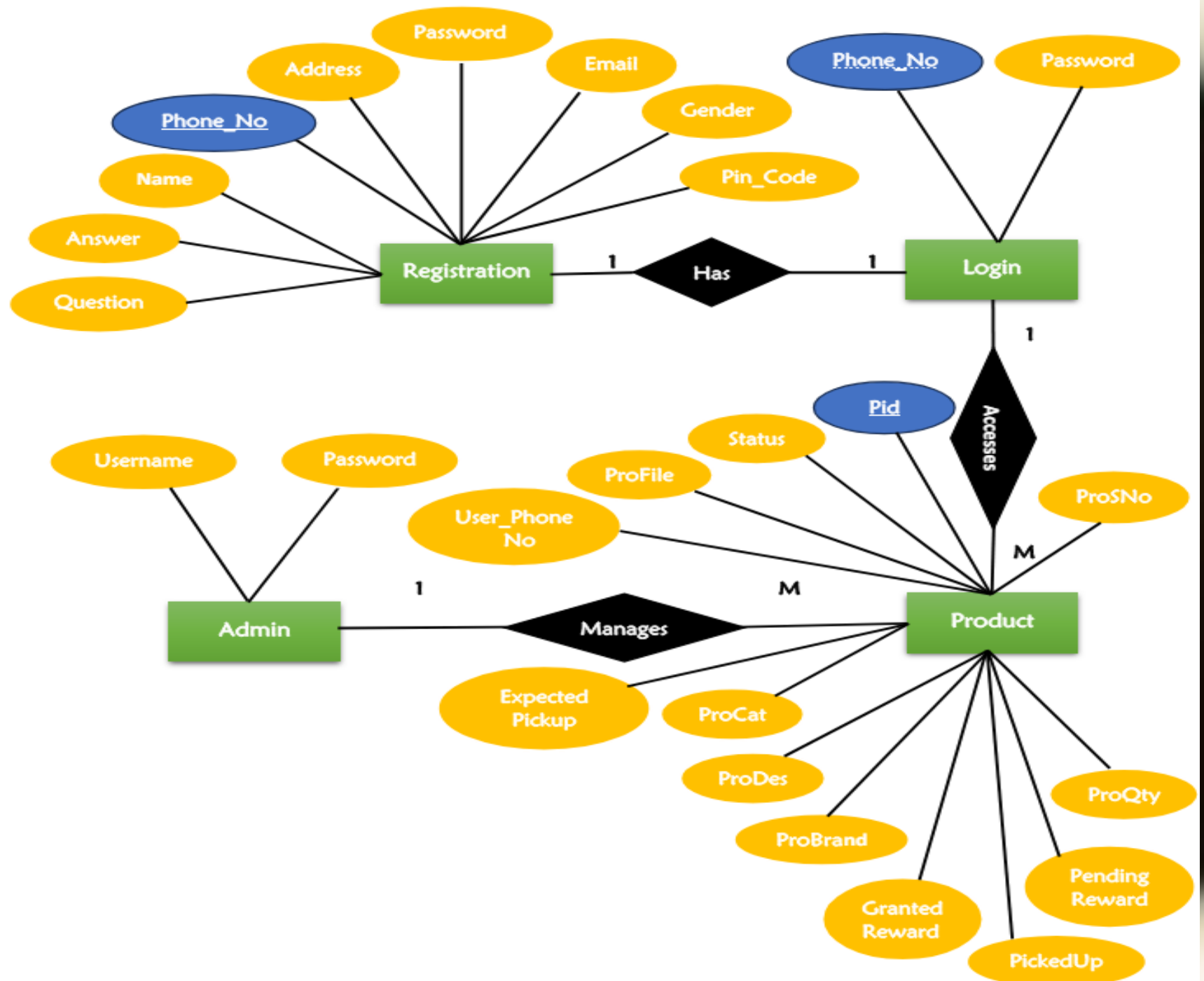|	Sno	Question
▷	1	select
	2	What is your favourite color?
	3	What is your first school?
	4	What is your nick name?
⊗	*NULL*	*NULL*

dbo.Question [Design] 📌 ✕

⬆ Update   Script File: dbo.Question.sql ▾

	Name	Data Type	Allow Nulls	Default
🔑	Sno	int	☐	
	Question	varchar(50)	☐	
			☐	

📄 Design / ▦ / 🖳 T-SQL

```
CREATE TABLE [dbo].[Question] (
    [Sno]          INT           IDENTITY (1, 1) NOT NULL,
    [Question]     VARCHAR (50) NOT NULL,
    PRIMARY KEY CLUSTERED ([Sno] ASC)
);
```

REGISTRATION DATABASE:

PRODUCT DATABASE:

Max Rows: 1000

	ProCat	ProBrand	ProSNo	ProQty	ProDes	ProFile	Status	User_Phon...	Expected Picku...	Pid	Picked...	Pen...	Grant...
▷	Air Conditioner	Bajaj	123	2	good	Product_File/for...	Approved	7584	01-01-2024	1	Yes	0	0
	Bulb	Acer	10	8	2	Product_Img/S...	Approved	988	01-01-2024	2	Yes	0	0
	Keyboard	Bajaj	1	1	1	Product_Img/S...	Rejected	988	NULL	3	No	0	0
	Bulb	Apple	1	3	1	Product_Img/S...	Rejected	988	NULL	4	No	0	0
	Fan	Intel	1	1	1	Product_Img/S...	Approved	988	23-05-2024	5	No	0	0
	Electric Kitchen ...	Bajaj	10	12	10	Product_Img/S...	Approved	988	23-05-2024	6	No	0	0
	Home Theatre	Asus	123	1	1	Product_Img/S...	Approved	988	08-05-2024	7	Yes	0	0
	Bulb	HTC	1	35	xsxsx	Product_Img/S...	Approved	789	17-05-2024	8	NULL	0	0
	Mobile Phone	HTC	abcc	1	afx	Product_Img/S...	Pending	988	NULL	9	No	0	0
	Mobile Phone	HTC	abcc	1	afx	Product_Img/S...	Pending	988	NULL	10	No	0	0
	Air Cooler	Asus	1	2	1	Product_Img/S...	Pending	988	NULL	11	No	0	0
	DVD Player	Canon	C1	12	fdfg	Product_Img/S...	Approved	7584908501	08-05-2024	12	No	0	0
	CPU	AMD	1234	1	kkk	Product_Img/S...	Approved	8001702841	08-05-2024	13	No	0	0
	Air Conditioner	Boult	12	14	,,	Product_Img/a...	Approved	988	15-05-2024	16	Yes	0	0
	Fridge	Boult	5	5	5	Product_Img/l...	Pending	988	NULL	17	No	0	0
	Keyboard	Atari	56	12	hjb	Product_Img/l...	Approved	988	23-05-2024	18	Yes	600	600
	Fan	Godrej	2	5	m m	Product_Img/l...	Approved	988	21-05-2024	19	Yes	250	250
	Printer	Canon	abc	4	abc	Product_Img/l...	Approved	1234567890	31-05-2024	20	Yes	400	400
	Laptop	Acer	123	5	abc	Product_Img/w...	Approved	9339097544	14-05-2024	21	Yes	500	500
	CPU	Acer	123	5	abc	Product_Img/1...	Approved	9339097544	15-05-2024	22	Yes	500	500
⊛	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

dbo.Upload [Design] 📌 ✕ | dbo.Upload [Data] | dbo.Upload [Data]

⬆ Update | Script File: | dbo.Upload.sql ▾

Name	Data Type	Allow Nulls	Default
ProCat	varchar(50)	☑	
ProBrand	varchar(50)	☑	
ProSNo	varchar(50)	☑	
ProQty	int	☑	
ProDes	varchar(500)	☑	
ProFile	varchar(50)	☐	
Status	varchar(10)	☐	
User_Phone_No	varchar(50)	☐	
Expected Pickup Date	date	☑	
🔑 Pid	int	☐	
PickedUp	varchar(10)	☑	
Pending Reward	int	☑	
Granted Reward	int	☑	
		☐	

```sql
CREATE TABLE [dbo].[Upload] (
    [ProCat]               VARCHAR (50)   NULL,
    [ProBrand]             VARCHAR (50)   NULL,
    [ProSNo]               VARCHAR (50)   NULL,
    [ProQty]               INT            NULL,
    [ProDes]               VARCHAR (500)  NULL,
    [ProFile]              VARCHAR (50)   NOT NULL,
    [Status]               VARCHAR (10)   NOT NULL,
    [User_Phone_No]        VARCHAR (50)   NOT NULL,
    [Expected Pickup Date] DATE           NULL,
    [Pid]                  INT            IDENTITY (1, 1) NOT NULL,
    [PickedUp]             VARCHAR (10)   NULL,
    [Pending Reward]       INT            NULL,
    [Granted Reward]       INT            NULL,
    CONSTRAINT [PK_Upload] PRIMARY KEY CLUSTERED ([Pid] ASC)
);
```

RESULT
(SNAPSHOTS OF WEB APPLICATION)

SIGN UP PAGE :

Register WITH TECHTRASH

Name	
Gender	○ Male ○ Female ○ Other
Phone No.	
Email	
Address	
Pin Code	
Security Question	select ⌄
Security Answer	
Set Password	
Confirm Password	

Register

DONOR LOG-IN PAGE:

Donor Login Page

Phone No.

Password

Forgot Password?

Sumbit

HOME   ABOUT US   CONTACT US

TECHTRASH - Tech In The Bin, Help Earth Win!

PASSWORD RECOVERY PAGE:

✕

Recover Your Password

Phone No.

[   ]

Chosen Security Question

[select   ▾]

Answer

[   ]

Get the Password

Try to Login

PRODUCT DETAILS:

Product Details

Product Category	CPU
Brand of the Product	Acer
Product Serial No.	123
Quantity in Pieces	5
Describe the Product	abc
Image	Choose file No file chosen

Submit

Uploaded Successfully ✅   500 E-Coin is Waiting for You ⏳

Your Alloted Pid: 21

Log Out   Track Your Request   Check Your E-Coins

PRODUCT TRACKING:

REWARD TRACKING:

Your Total Achieved E-Coin 🪙 : 500

** FOR EACH COIN YOU CAN AVAIL DISCOUNT OF ₹10**

REDEEM E-COINS

YOUR REWARDS

ProCat	ProBrand	ProSNo	ProQty	ProFile	Pid	Expected_Pickup_Date	Granted_Reward
Laptop	Acer	123	5	Product_Img/wallpaperflare.com_wallpaper (9).jpg	21	14-05-2024 00:00:00	500

ADMIN LOGIN PAGE

Welcome To Admin Login Page

Username:

Password

Login

ADMIN DASHBOARD:

Welcome Admin
Select the Action You Want to Take

○ **View All Registered User**   ○ **View Product Pending Requests**   ○ **View the Approval History**

Log Out

REGISTED USER DATA:

Welcome Admin
Select the Action You Want to Take

○ **View All Registered User**   ○ **View Product Pending Requests**   ○ **View the Approval History**

Log Out

	Name	Gender	Phone_No	Email	Address	Pin_Code	Password	Question	Answer
Edit Delete Select	Rahul	Male	111	1@1	mid	721	1	What is your first school?	Abc
Edit Delete Select	Rahul	Male	12	1@1	1	1	123	What is your favourite color?	b
Edit Delete Select	ABC	Male	1234567890	abc@gmail.com	abc	123	abc	What is your first school?	abc
Edit Delete Select	Rahul	Male	789	1@1	12	122	1	What is your favourite color?	b
Edit Delete Select	riju	Male	8001702841	riju@gmail.com	medinipur	721101	123	What is your favourite color?	green
Edit Delete Select	Rahul	Male	9339097544	rahulmolla@gmail.com	abc	721232	123	What is your favourite color?	red

PENDING REQUEST:

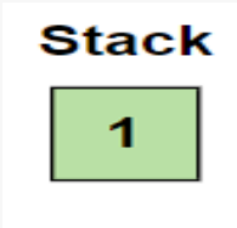○ View All Registered User   ● View Product Pending Requests   ○ View the Approval History

[Log Out]
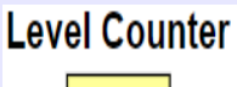
	ProCat	ProBrand	ProSNo	ProQty	ProDes	ProFile	Status	User_Phone_No	Pid	Product Image	Action	Rejection
Edit Delete Select	Mobile Phone	HTC	abcc	1	afx	Product_Img/Screenshot 2023-11-20 095555.png	Pending	988	9		Click to Approve	Reject
Edit Delete Select	Mobile Phone	HTC	abcc	1	afx	Product_Img/Screenshot 2023-11-20 095555.png	Pending	988	10		Click to Approve	Reject
Edit Delete Select	Air Cooler	Asus	1	2	1	Product_Img/Screenshot 2023-11-20 095540.png	Pending	988	11		Click to Approve	Reject
Edit Delete Select	Fridge	Boult	5	5	5	Product_Img/IMG-20240428-WA0012.jpg	Pending	988	17		Click to Approve	Reject
Edit Delete Select	CPU	Acer	123	5	abc	Product_Img/1813080.jpg	Pending	9339097544	22		Click to Approve	Reject

ORDER HISTORY:

○ View Approved Product

○ View Picked Up Order

APPROVED PRODUCT:

○ View Approved Product   ○ View Picked Up Order

ProCat	ProBrand	ProSNo	ProQty	Status	User_Phone_No	Pid	PickedUp	ProFile	Image	PickUp Confirmation
Air Conditioner	Bajaj	123	2	Approved	7584	1	Yes	Product_File/form_div_cal_cv.pdf		PickedUp Confirmed
Bulb	Acer	10	8	Approved	988	2	Yes	Product_Img/Screenshot 2023-11-20 095200.png		PickedUp Confirmed
Fan	Intel	1	1	Approved	988	5	No	Product_Img/Screenshot (19).png		PickedUp Confirmed
Electric Kitchen Equipment	Bajaj	10	12	Approved	988	6	No	Product_Img/Screenshot 2024-03-03 162337.png		PickedUp Confirmed

PICKED UP ORDER HISTORY:

○ View Approved Product   ● View Picked Up Order

ProCat	ProBrand	ProSNo	ProQty	ProFile	User_Phone_No	Expected_Pickup_Date	Pid	Granted_Reward	Product Image
Air Conditioner	Bajaj	123	2	Product_File/form_div_cal_cv.pdf	7584	01-01-2024 00:00:00	1	0	
Bulb	Acer	10	8	Product_Img/Screenshot 2023-11-20 095200.png	988	01-01-2024 00:00:00	2	0	
Home Theatre	Asus	123	1	Product_Img/Screenshot 2023-11-20 095519.png	988	08-05-2024 00:00:00	7	0	
Air Conditioner	Boult	12	14	Product_Img/ab.png	988	15-05-2024 00:00:00	16	0	
Keyboard	Atari	56	12	Product_Img/IMG-20240428-WA0006.jpg	988	23-05-2024 00:00:00	18	600	

Track Your Product's Status

Enter the Pid: `22`

Check

Your Product has been Picked Up 🚚

Logout   Back

REWARD RECORDS

Your Total Achieved E-Coin 🪙 : 1000
** FOR EACH COIN YOU CAN AVAIL DISCOUNT OF ₹10**

REDEEM E-COINS

YOUR REWARDS

ProCat	ProBrand	ProSNo	ProQty	ProFile	Pid	Expected_Pickup_Date	Granted_Reward
Laptop	Acer	123	5	Product_Img/wallpaperflare.com_wallpaper (9).jpg	21	14-05-2024 00:00:00	500
CPU	Acer	123	5	Product_Img/1813080.jpg	22	15-05-2024 00:00:00	500

PROFIT MODEL

- **PPP (Public Private Partnership)**

- **EPR (Extended Producer Responsibility Program)**

- **Dismantling or auctioning the electronic parts and selling them to different industries**

- **Refurbishing and Reselling**

https://www.pppinindia.gov.in/

https://eprplastic.cpcb.gov.in/

REWARDS POINTS

E-Waste Category	Examples	Reward Points
Small Electronics	Mobile phones, tablets, cameras	100 points/item
Large Electronics	Televisions, refrigerators, washers	500 points/item
Computer Equipment	Laptops, desktops, monitors	300 points/item
Small Appliances	Microwaves, toasters, coffee makers	150 points/item
Batteries	Rechargeable batteries, car batteries	50 points/item
Lighting Equipment	LED bulbs, fluorescent tubes	75 points/item
Printers & Peripherals	Printers, scanners, keyboards, mice	200 points/item
Audio/Visual Equipment	Stereos, speakers, DVD players	250 points/item
Cables & Accessories	Power cords, chargers, adapters	25 points/item
Miscellaneous	Wearable tech, smart home devices	100 points/item

CONCLUSION

After analyzing and surveying some of the popular pre – existing E-Waste Management System projects in the market, we have come to the conclusion that there are some limitations to those projects which can further be solved by different approach. In reality, there are very little software application regarding e-waste management.

So, we have come with several ideas to tackle the problems with more optimized methods that are to be implemented in the project.

LIMITATIONS

- E-mail or Mobile No. notifications is not available.

- Location tracking through Google map is not available.

- User have no option to pick option to pick up date as per availability.

- User cannot redeem the rewards points.

FUTURE WORK

Our main plan to overcome the limitations and implement all possible features in our application. Here, our future working methods are described below-

1. We will develop a comprehensive feature list for the e-waste Management System App based on the literature survey and user needs.

2. We will try to fulfil our objectives mentioned above through development of this Application.

3. We will provide a user-friendly and intuitive interface for data entry, e-waste selling and reporting, ensuring that users can easily input information about their e-waste disposal and recycling activities.

4. We will implement more features for tracking and monitoring e-waste collection and recycling efforts, providing users with real-time updates on their environmental impact.

5. Refine the app based on user feedback and conduct further testing to ensure a seamless user experience.

REFERENCES

➢ [1] Praan Vaayu e-waste management (Author – Arth Technology - India):

https://play.google.com/store/apps/details?id=com.praanva ayu.ewaste

➢ [2] UZED – Recycle plastic, e-waste (Author –Rapidue Technologies Pvt. Ltd.):

https://play.google.com/store/apps/details?id=com.rapidue. uzed

➢ [3] i899 Recycling – E- waste Recycle (Author – Spas Group of Companies):

i899 Recycling- E-waste Recycl - Apps on Google Play

➢ [4] Zolopik E-Waste Recycling:

https://www.zolopik.com/

Thank You