OS Hackathon Challenge - Pre-Qualification Assignment

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1. Github Code Repository

Link to Repository:

https://github.com/Mohanish-5744/OS-Hackathon-Challenge---Pre-Qualification-Assignment-Mohanish.git

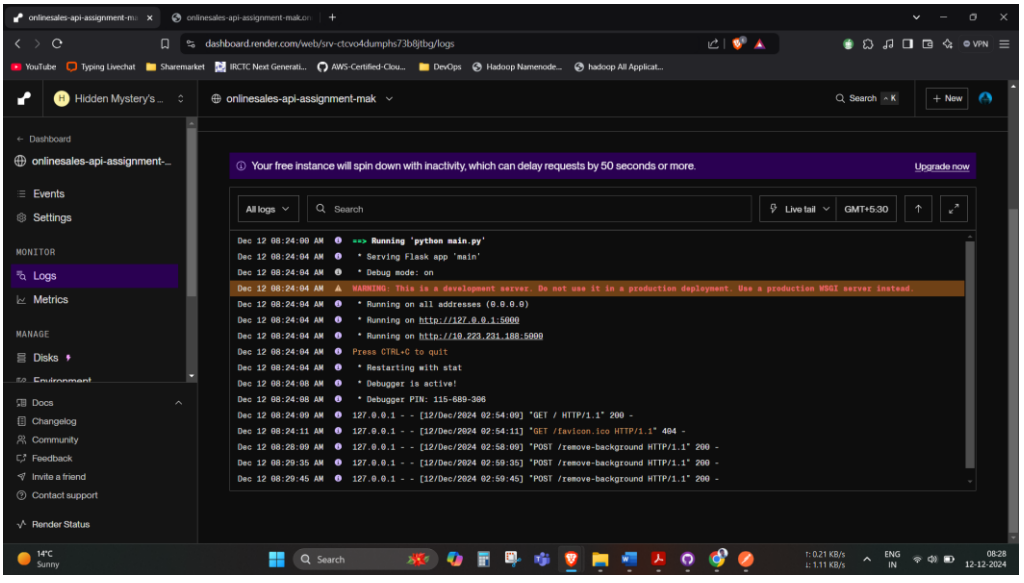
- Also shared the repository link with hackathon@onlinesales.ai and also grant acces for the same.

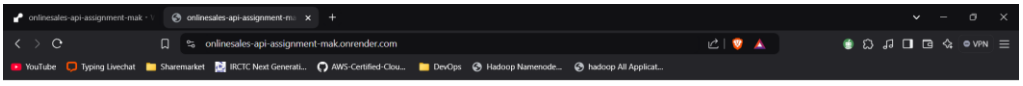
2. API Hosting

API is deployed on the Render Website Link for the same is given below:

https://onlinesales-api-assignment-mak.onrender.com/

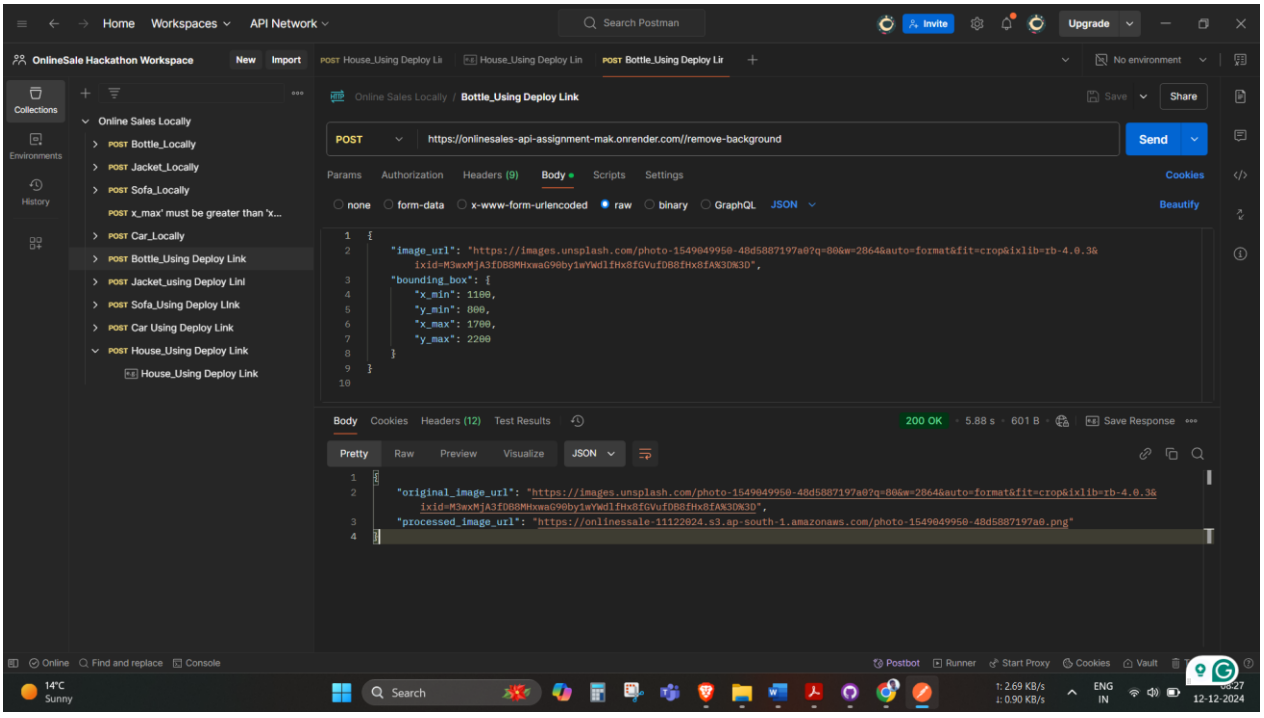
It will take nearly 30-50 seconds to start the service because of free tier instance kindly consider this issue.





Testing link of API through Postman:

https://onlinesales-api-assignment-mak.onrender.com//remove-background

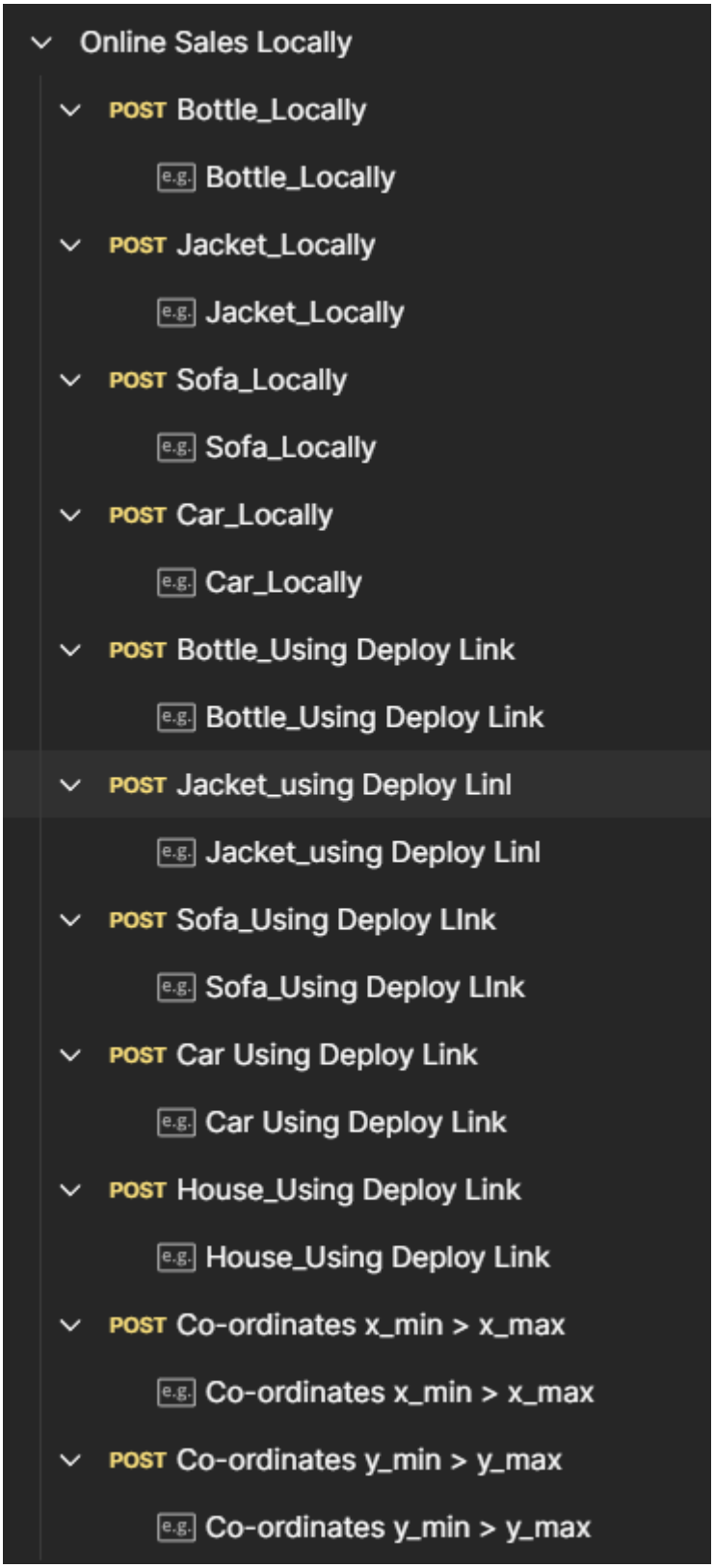


3. Postman Collection:

There is a collection name called Onilne Sales Hackathon API for testing API and created workspace and given access to email hackathon@onlinesales.ai below is the testing images. The collection is also uploaded on the GitHub repository link for the same is given below:

https://github.com/Mohanish-5744/OS-Hackathon-Challenge---Pre-Qualification-Assignment-Mohanish/blob/main/Online%20Sales%20Hackathon%20API.postman_collection.json

We have tested it first locally and then by deployable link. We have tested for 4 images that you gave and and additional House images for checking API. We also tested for if co-ordinates xmin> xmax error will occur and ymin> ymax error will occur.


Online Sales Locally
POST Bottle_Locally
e.g. Bottle_Locally
POST Jacket_Locally
e.g. Jacket_Locally
POST Sofa_Locally
e.g. Sofa_Locally
POST Car_Locally
e.g. Car_Locally
POST Bottle_Using Deploy Link
e.g. Bottle_Using Deploy Link
POST Jacket_using Deploy Linl
e.g. Jacket_using Deploy Linl
POST Sofa_Using Deploy LInk
e.g. Sofa_Using Deploy LInk
POST Car Using Deploy Link
e.g. Car Using Deploy Link
POST House_Using Deploy Link
e.g. House_Using Deploy Link
POST Co-ordinates x_min > x_max
e.g. Co-ordinates x_min > x_max
POST Co-ordinates y_min > y_max
e.g. Co-ordinates y_min > y_max

4. Documentation

How to set up and run the code locally.

1. Clone the repository in your local system.
2. Install requirements.txt file given in repository in the local machine using below command make sure python is install on your computer.

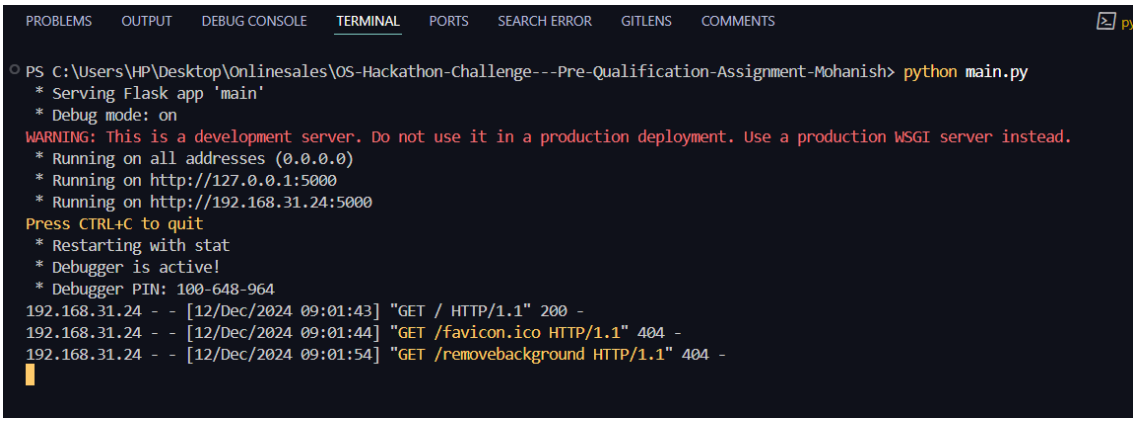
   Command -> pip install -r requirements.txt

3. Now open terminal and put below command to run api you will get below output in the terminal

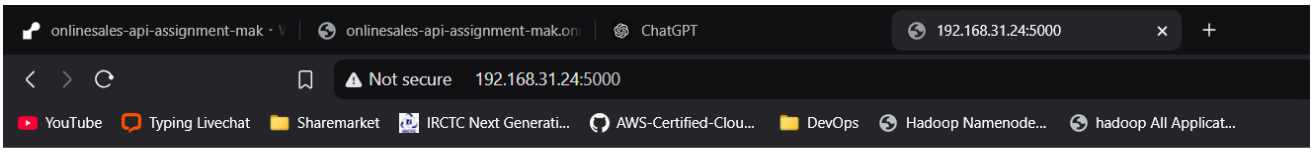
   Command-> python main.py

   You will get below output

   PS C:\Users\HP\Desktop\Onlinesales\OS-Hackathon-Challenge---Pre-Qualification-Assignment-Mohanish> python main.py
   * Serving Flask app 'main'
   * Debug mode: on
   WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
   * Running on all addresses (0.0.0.0)
   * Running on http://127.0.0.1:5000
   * Running on http://192.168.31.24:5000
   Press CTRL+C to quit
   * Restarting with stat
   * Debugger is active!
   * Debugger PIN: 100-648-964



   Chek http://127.0.0.1:5000 You will get below message

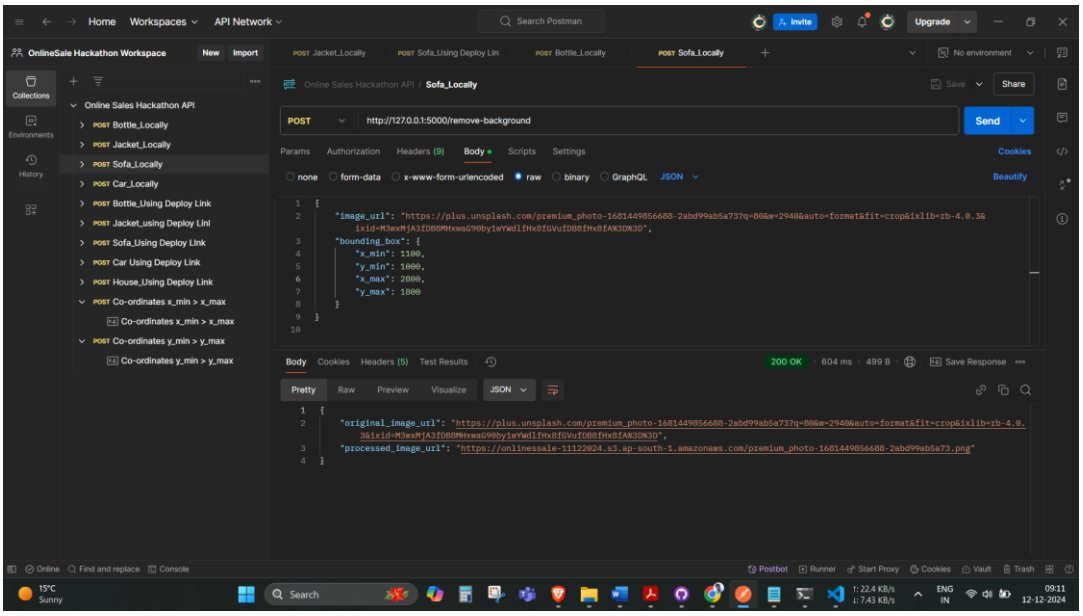


Welcome to Onlinesales API Assignment!

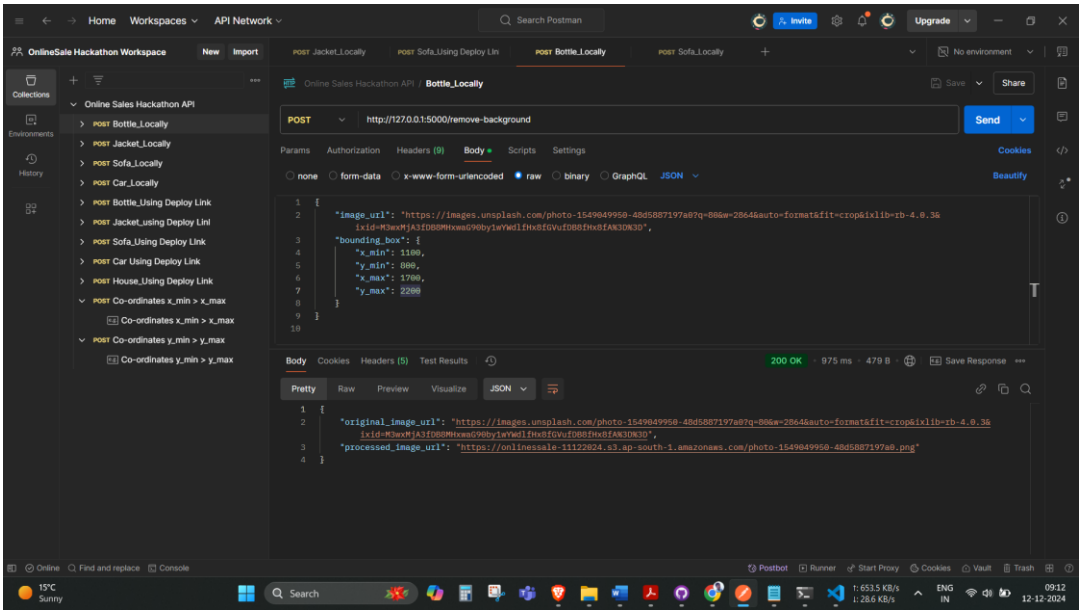
4. Open Postman and put http://127.0.0.1:5000/remove-background on Post request and add JSON file below

```
{
  "image_url": "https://images.unsplash.com/photo-1549049950-
48d5887197a0?q=80&w=2864&auto=format&fit=crop&ixlib=rb-
4.0.3&ixid=M3wxMjA3fDB8MHxwaG90by1wYWdlfHx8fGVufDB8fHx8fA%3D%3D",
  "bounding_box": {
    "x_min": 1100,
    "y_min": 800,
    "x_max": 1700,
    "y_max": 2200
  }
}
```

Sofa Testing



Bottle Testing



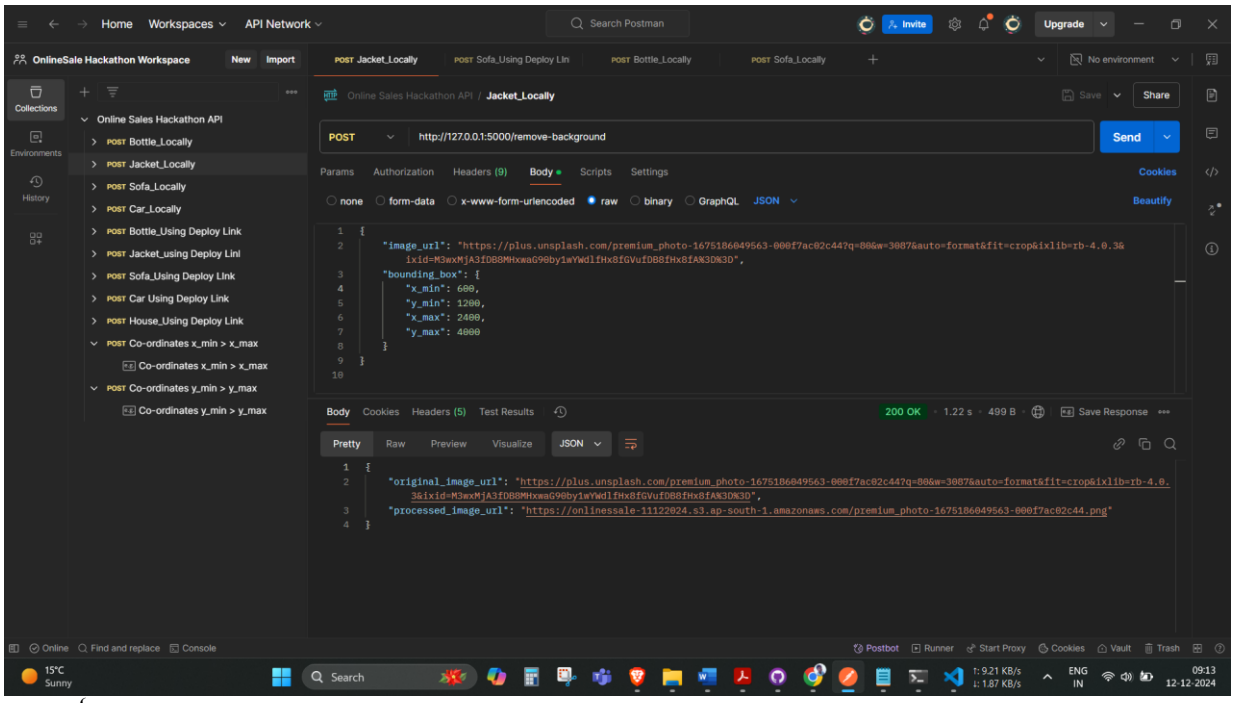
{

"original_image_url": "https://images.unsplash.com/photo-1549049950-48d5887197a0?q=80&w=2864&auto=format&fit=crop&ixlib=rb-4.0.3&ixid=M3wxMjA3fDB8MHxwaG90by1wYWdlfHx8fGVufDB8fHx8fA%3D%3D",

"processed_image_url": "https://onlinessale-11122024.s3.ap-south-1.amazonaws.com/photo-1549049950-48d5887197a0.png"

}

Jacket Testing



{

"original_image_url": "https://plus.unsplash.com/premium_photo-1675186049563-000f7ac02c44?q=80&w=3087&auto=format&fit=crop&ixlib=rb-4.0.3&ixid=M3wxMjA3fDB8MHxwaG90by1wYWdlfHx8fGVufDB8fHx8fA%3D%3D",

"processed_image_url": "https://onlinessale-11122024.s3.ap-south-1.amazonaws.com/premium_photo-1675186049563-000f7ac02c44.png"

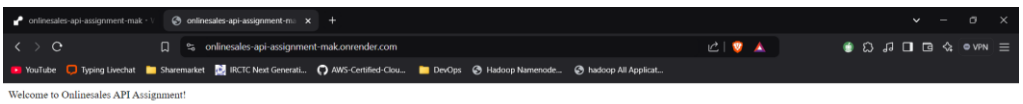
}

Instructions for API usage (including input/output contracts).

1. For Testing API is working or not use below link:

   https://onlinesales-api-assignment-mak.onrender.com/

   It will take nearly 30-50 seconds to start the service because of free tier instance kindly consider this issue. It will give below output



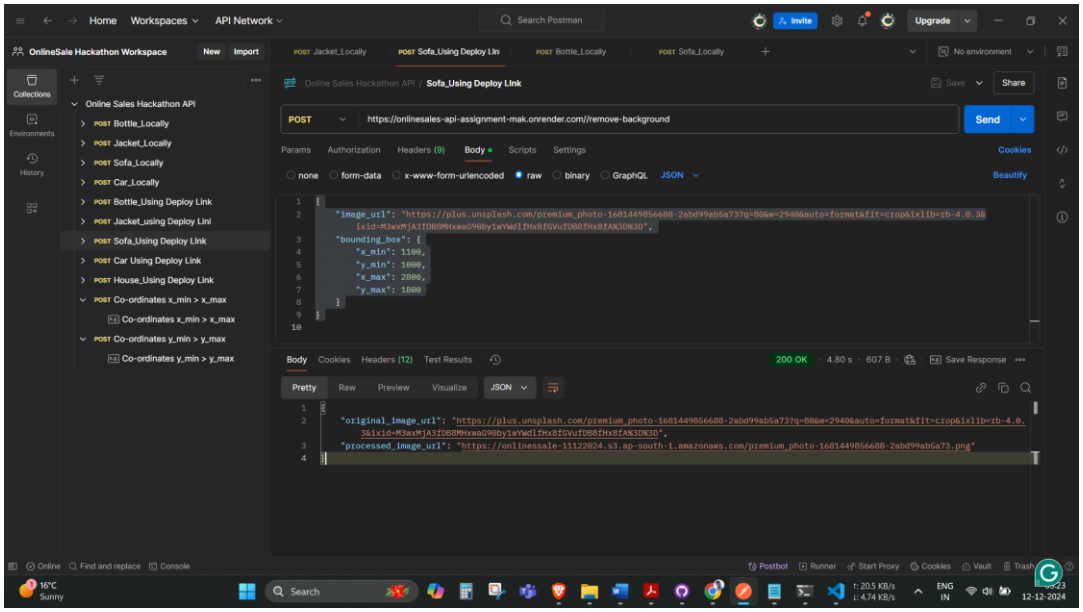
C

2. Open Postman, create new collection and test using put below link with POST request and Json file given below according to assignment.

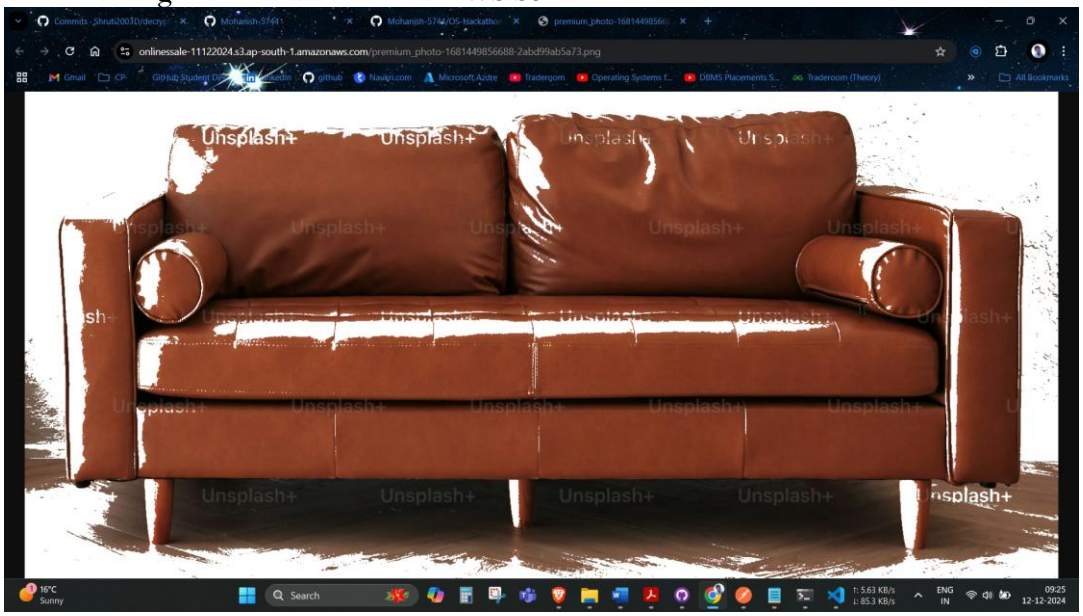
   https://onlinesales-api-assignment-mak.onrender.com//remove-background

JSON File:


```
{
  "image_url": "https://plus.unsplash.com/premium_photo-1681449856688-2abd99ab5a73?q=80&w=2940&auto=format&fit=crop&ixlib=rb-4.0.3&ixid=M3wxMjA3fDB8MHxwaG90by1wYWdlfHx8fGVufDB8fHx8fA%3D%3D",
  "bounding_box": {
    "x_min": 1100,
    "y_min": 1000,
    "x_max": 2800,
    "y_max": 1800
  }
}
```

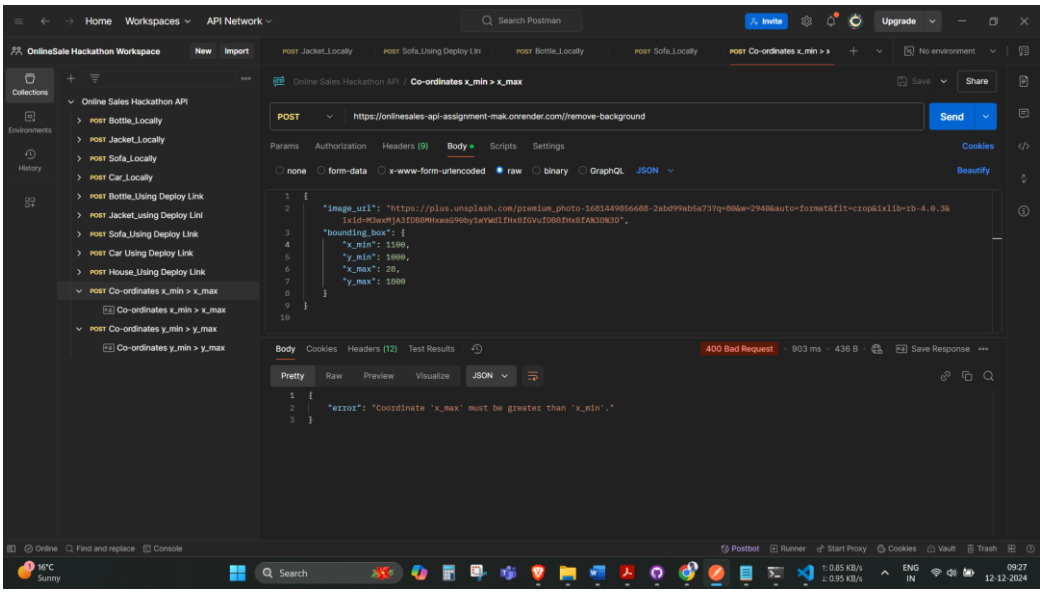



Processed image of sofa and stored in AWS S3.



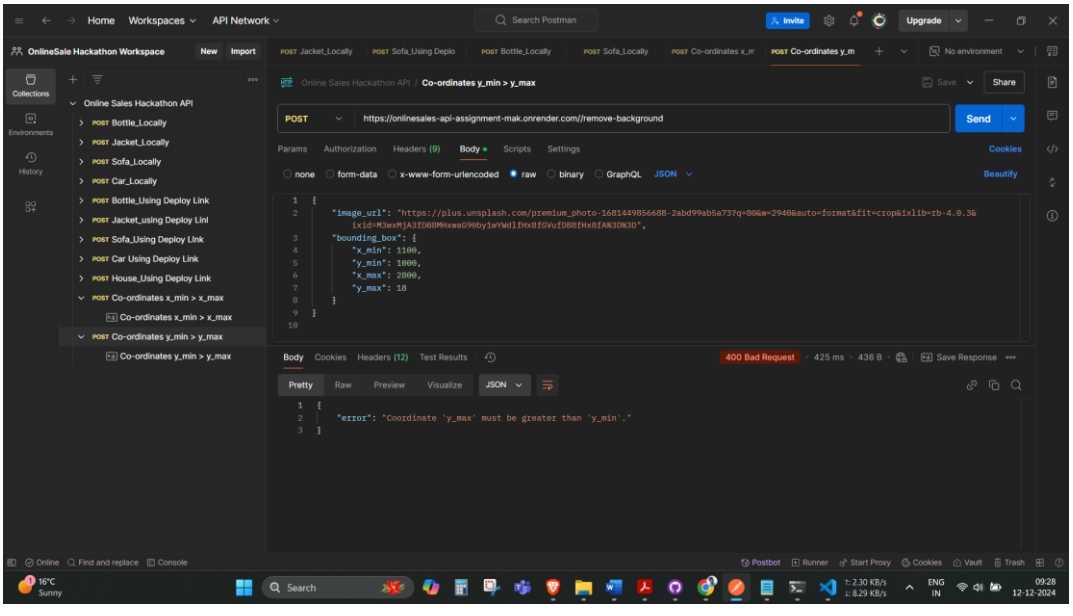
We have also chek for xmin>xmax and error is occurred. You can use below JSON file with same API and xmin>xmax co-ordinates given below.


```
{
  "image_url": "https://plus.unsplash.com/premium_photo-1681449856688-2abd99ab5a73?q=80&w=2940&auto=format&fit=crop&ixlib=rb-4.0.3&ixid=M3wxMjA3fDB8MHxwaG90by1wYWdlfHx8fGVufDB8fHx8fA%3D%3D",
  "bounding_box": {
    "x_min": 1100,
    "y_min": 1000,
    "x_max": 28,
    "y_max": 1800
  }
}
```

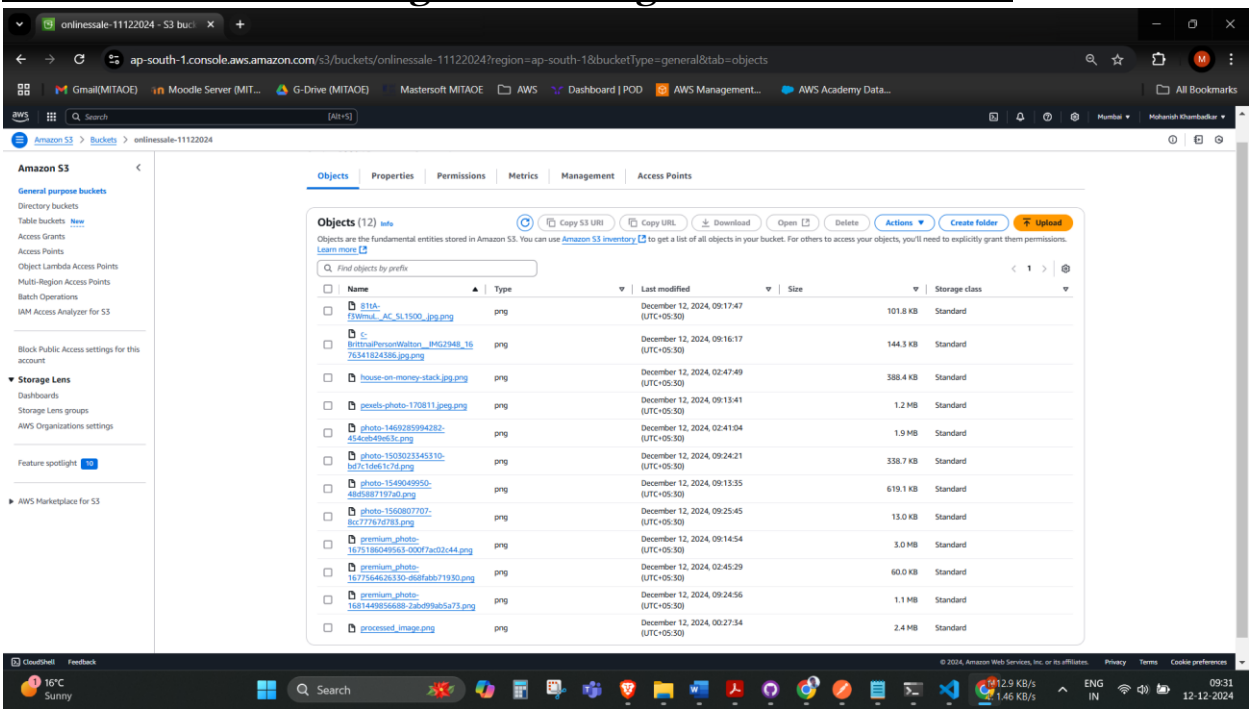



And same for y co-ordinates.


```
{
  "image_url": "https://plus.unsplash.com/premium_photo-1681449856688-2abd99ab5a73?q=80&w=2940&auto=format&fit=crop&ixlib=rb-4.0.3&ixid=M3wxMjA3fDB8MHxwaG90by1wYWdlfHx8fGVufDB8fHx8fA%3D%3D",
  "bounding_box": {
    "x_min": 1100,
    "y_min": 1000,
    "x_max": 2800,
    "y_max": 18
  }
}
```

All the Processed images is storing in AWS S3 bucket



A brief explanation of the tools, frameworks, or libraries used

Tools used :

- Render:
  - A cloud-based platform for deploying and hosting web applications and APIs.
  - Used in this project to deploy the Flask application, providing scalability and secure HTTPS connections.
- Postman:
  - A widely used API testing tool.
  - Used for sending HTTP requests to the /remove-background endpoint with JSON payloads and validating the API's functionality by examining the responses.

Framework

- Flask:
  - A micro web framework in Python designed for building web applications and APIs.
  - In this project:
  - Defines routes (/remove-background and /) to handle HTTP requests.
  - Uses jsonify to format Python objects into JSON for API responses.
  - Facilitates parsing incoming data with request.

Libraries Used

- requests:
  - A Python library for making HTTP requests.
  - Used to download the image from the provided URL.
- OpenCV (cv2):
  - An open-source library for computer vision and image processing.

    - In this project:
        - Decodes images from bytes.
        - Processes the image to remove the background and replace it with a white background.
        - Crops the specified region of interest (ROI).
        - Applies grayscale conversion and binary thresholding.

- NumPy (np):
    - A library for efficient numerical and array operations.
    - Used to handle and manipulate image data as multidimensional arrays.
- AWS SDK for Python (boto3):
    - A library for interfacing with AWS services, such as S3.
    - Used to upload processed images to an S3 bucket with public access permissions.
- BytesIO (from io):
    - Used to handle image data as byte streams during encoding and uploading to S3.
- Pillow (PIL):
    - An image processing library in Python.
    - Although imported, it's not explicitly used in the current code. However, it could be helpful for additional image manipulations.
- urllib.parse:
    - Provides functions for parsing URLs.
    - Used to extract filenames from the provided image URLs for generating valid S3 keys.
- os:
    - A standard Python library for interacting with the operating system.
    - Used to manage file paths and extract filenames from URLs.