Mystic Visions

GROUP-26

2021BCS0053
2021BCS0081
2021BCS0115
2021BCS0185

23/1/2023

—

ICS 214

—

Dr Cinu C. Kiliroor

INTRODUCTION

"Every picture tells a story"

- Anastasia Hollings

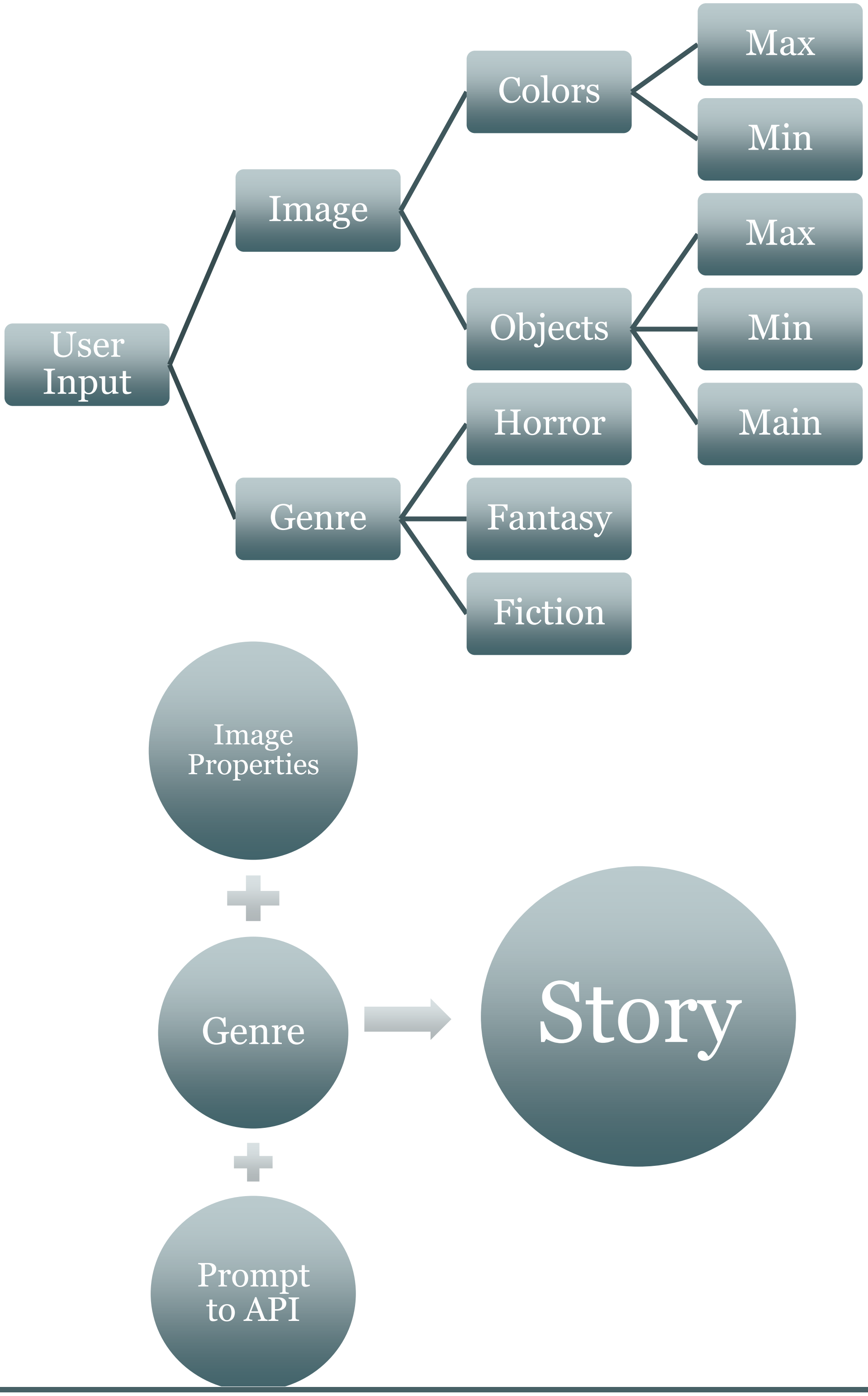
Can we tell yours?

'MysticVisions' is a webapp that generates automated stories for any given image.

Every picture
has a story to tell

THE PROCESS

HOW DOES IT WORK?


User Input
Image
Colors
Max
Min
Objects
Max
Min
Main
Genre
Horror
Fantasy
Fiction
Image Properties
Genre
Prompt to API
Story

CODE BREAKDOWN:

The code is a Flask web application that generates a story based on a given genre and an image.
The web application accepts an image and genre from a web form and saves the image to the server. The image is then processed to determine the most common color and the least common color in the image. The object detection function is called to determine the main object, most common object, and least common object in the image. A prompt is then generated based on the genre, the most and least common color, and the objects in the image. The prompt is used to generate a story with OpenAI's language generation model "text-davinci-003". Finally, the generated story is returned to the user on the index page of the website.

1. object_detection() function identifies the main object, maximum repeated objects and least appearing objects in the image

2. color_detection() function identifies the maximum and minimum spread colours in the image

3. generate_prompt() function generates customized prompt for each genre using the obtained image properties.

4. And Finally, generate_story() function is the main function. It calls all the other functions and using OpenAI’s GPT 3’s API Model *text-davinci-003* generates the output story

DEEP DIVE INTO CODE:

1. **object_detection()**
   FCOS modal is used which is faster and efficient than YOLO.
   Specifically, ‘fcos_resnet50_fpn’ backbone is used.
   This function performs object detection on an image using the FCOS (Fully Convolutional One-Stage) object detection model.

   The image is read and transformed using the "read_image" and "to_pil_image" functions from the torchvision library.

   The model is then loaded using the "fcos_resnet50_fpn" function, with the weights set to the default value. The model is set to evaluation mode using the "model.eval()" method.
   Label set is created and the object with highest confidence score is set to main_obj, the object occurring most times in the set is max_obj and least is min_obj

2. **color_detection()**
   The color_detection function uses the Python Imaging Library (PIL) to open the image and resize it to reduce the number of pixels. It then uses the load() function to get all the pixels in the image, and uses a list comprehension to get the color of each pixel.

   The function then uses the collections.Counter class to count the number of occurrences of each color in the image, and uses the most_common() method to get the most common color and least_common() method to get the least common color.

   Then, it uses the webcolors library to convert the RGB color to a human-readable format.

   It has closest_color function to find nearest color using 'Euclidean distance' if color is not found in the webcolors.CSS3_HEX_TO_NAMES_MAP dictionary.

3. **generate_story()**

generate_story() function creates a completion request using OpenAI's API, specifically the **openai.Completion** class.

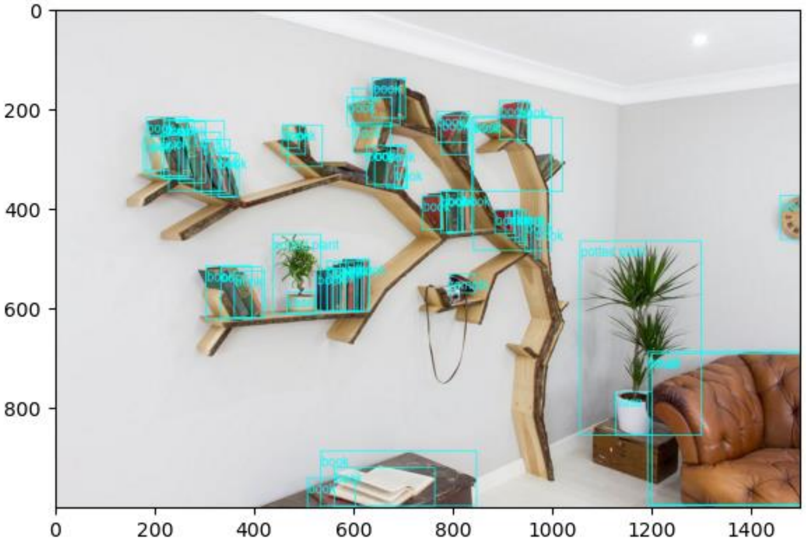
The following parameters are being passed to the **create** method:

- **engine**: The language model to use for generating the completion, specified by the **model** variable.
- **prompt**: The prompt, or initial text, for the completion, specified by the **prompt** variable.
- **max_tokens**: The maximum number of tokens, or individual elements in the input sequence, to generate in the completion. The value is set to 1024.
- **n**: The number of completions to generate, set to 1.
- **stop**: A sequence of tokens at which the completion should stop generating tokens, set to **None**.
- **temperature**: The temperature, a value used to control the randomness of the generated tokens, set to 1. More temperature means more random

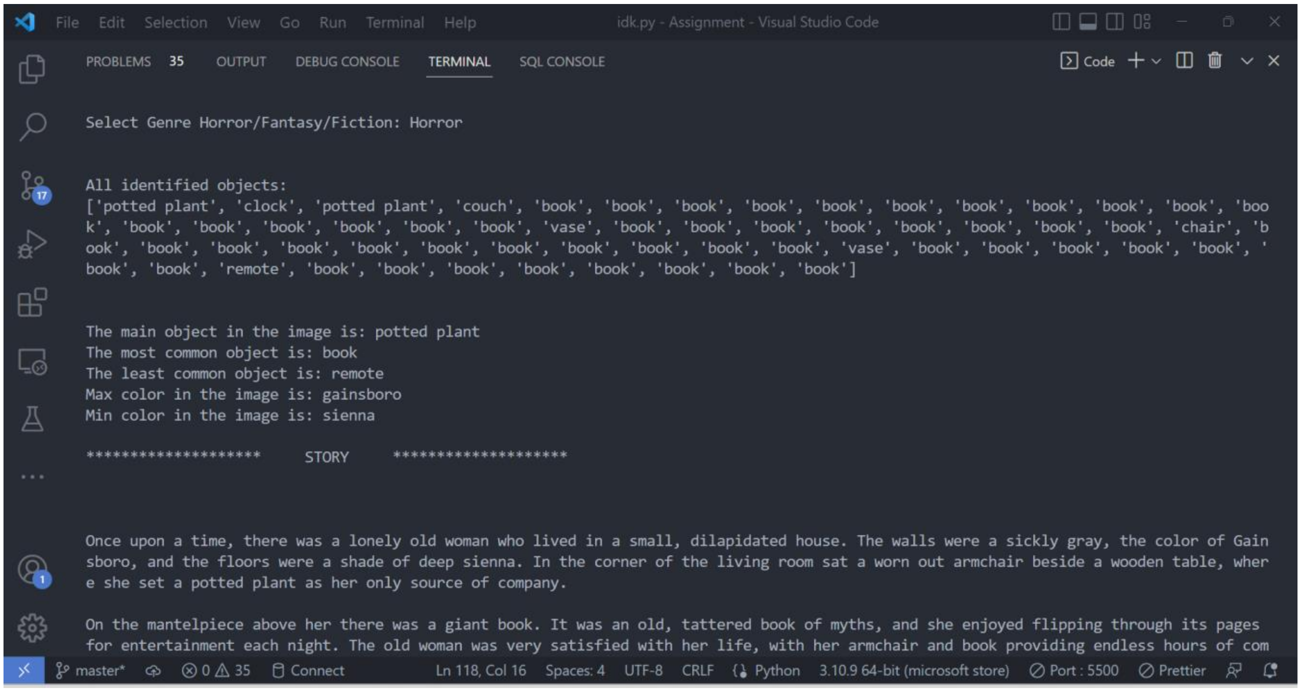
This code does not actually execute the request, it only creates the request object. The request would need to be sent using **. execute()** on the created object.

EXPERIMENTAL RESULTS:

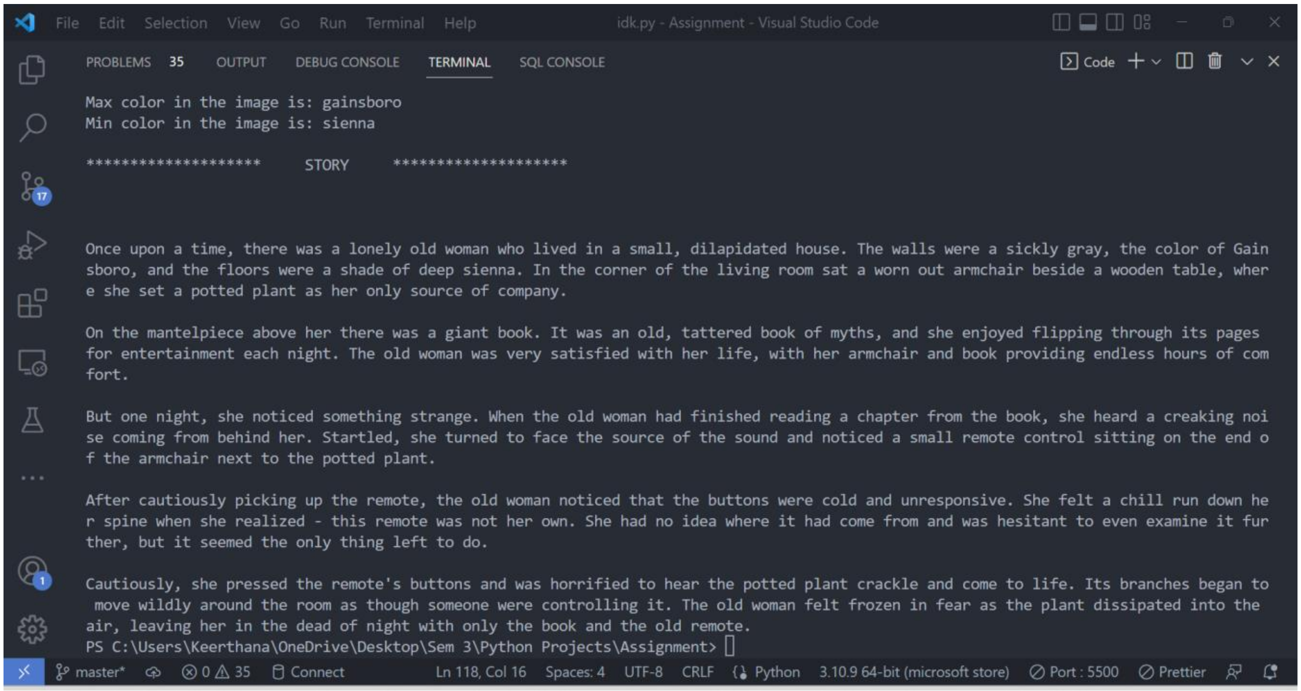
IMAGE:



GENRE: HORROR

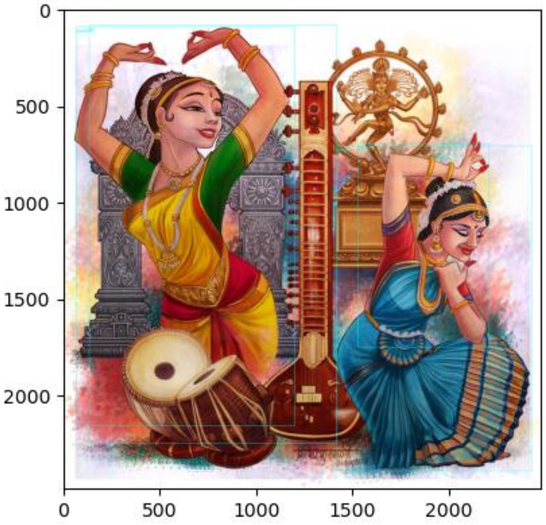

File Edit Selection View Go Run Terminal Help
idk.py - Assignment - Visual Studio Code
PROBLEMS 35 OUTPUT DEBUG CONSOLE TERMINAL SQL CONSOLE
Code
master* ⊗ 0 ⚠ 35 Connect Ln 118, Col 16 Spaces: 4 UTF-8 CRLF Python 3.10.9 64-bit (microsoft store) Port : 5500 Prettier

```
Select Genre Horror/Fantasy/Fiction: Horror


All identified objects:
['potted plant', 'clock', 'potted plant', 'couch', 'book', 'book', 'book', 'book', 'book', 'book', 'book', 'book', 'book', 'book', 'boo
k', 'book', 'book', 'book', 'book', 'book', 'book', 'vase', 'book', 'book', 'book', 'book', 'book', 'book', 'book', 'book', 'chair', 'b
ook', 'book', 'book', 'book', 'book', 'book', 'book', 'book', 'book', 'book', 'book', 'vase', 'book', 'book', 'book', 'book', 'book', '
book', 'book', 'remote', 'book', 'book', 'book', 'book', 'book', 'book', 'book', 'book']


The main object in the image is: potted plant
The most common object is: book
The least common object is: remote
Max color in the image is: gainsboro
Min color in the image is: sienna

*******************      STORY      *******************



Once upon a time, there was a lonely old woman who lived in a small, dilapidated house. The walls were a sickly gray, the color of Gain
sboro, and the floors were a shade of deep sienna. In the corner of the living room sat a worn out armchair beside a wooden table, wher
e she set a potted plant as her only source of company.

On the mantelpiece above her there was a giant book. It was an old, tattered book of myths, and she enjoyed flipping through its pages
for entertainment each night. The old woman was very satisfied with her life, with her armchair and book providing endless hours of com
```

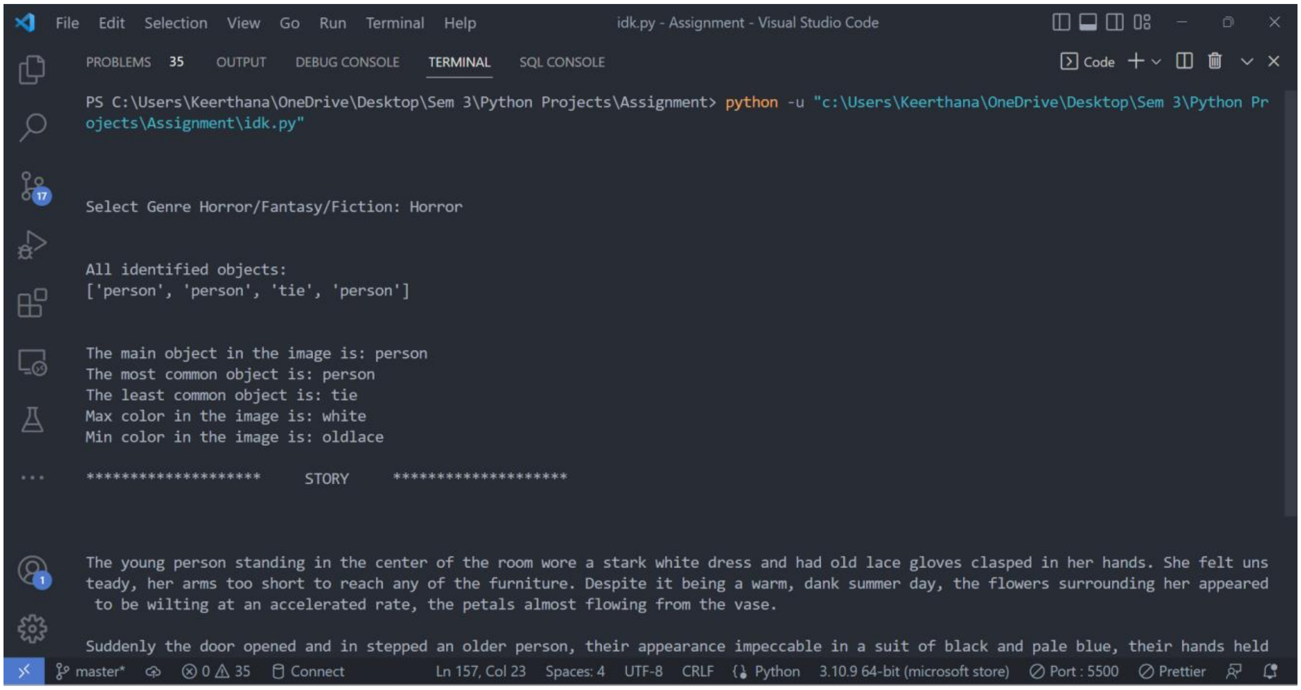

File Edit Selection View Go Run Terminal Help
idk.py - Assignment - Visual Studio Code
PROBLEMS 35 OUTPUT DEBUG CONSOLE TERMINAL SQL CONSOLE
Code
master* ⊗ 0 ⚠ 35 Connect Ln 118, Col 16 Spaces: 4 UTF-8 CRLF Python 3.10.9 64-bit (microsoft store) Port : 5500 Prettier

```
Max color in the image is: gainsboro
Min color in the image is: sienna

*******************      STORY      *******************



Once upon a time, there was a lonely old woman who lived in a small, dilapidated house. The walls were a sickly gray, the color of Gain
sboro, and the floors were a shade of deep sienna. In the corner of the living room sat a worn out armchair beside a wooden table, wher
e she set a potted plant as her only source of company.

On the mantelpiece above her there was a giant book. It was an old, tattered book of myths, and she enjoyed flipping through its pages
for entertainment each night. The old woman was very satisfied with her life, with her armchair and book providing endless hours of com
fort.

But one night, she noticed something strange. When the old woman had finished reading a chapter from the book, she heard a creaking noi
se coming from behind her. Startled, she turned to face the source of the sound and noticed a small remote control sitting on the end o
f the armchair next to the potted plant.

After cautiously picking up the remote, the old woman noticed that the buttons were cold and unresponsive. She felt a chill run down he
r spine when she realized - this remote was not her own. She had no idea where it had come from and was hesitant to even examine it fur
ther, but it seemed the only thing left to do.

Cautiously, she pressed the remote's buttons and was horrified to hear the potted plant crackle and come to life. Its branches began to
 move wildly around the room as though someone were controlling it. The old woman felt frozen in fear as the plant dissipated into the
air, leaving her in the dead of night with only the book and the old remote.
PS C:\Users\Keerthana\OneDrive\Desktop\Sem 3\Python Projects\Assignment> 
```

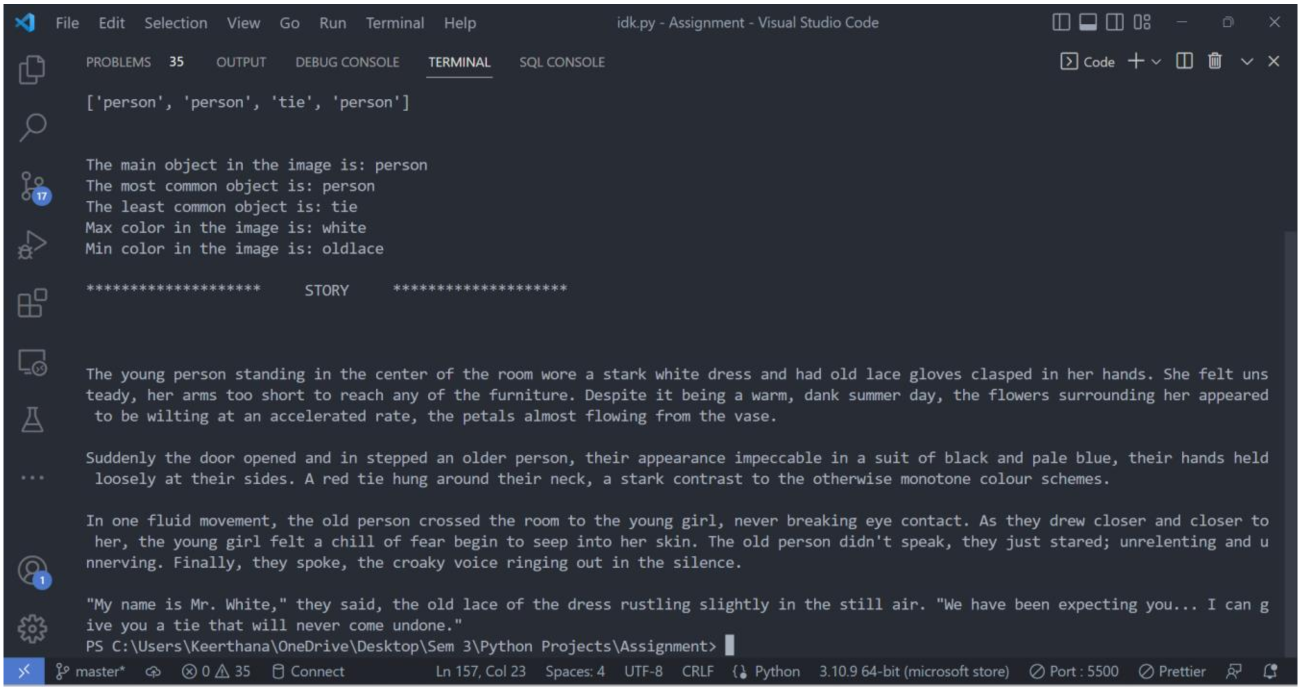
IMAGE:


0
500
1000
1500
2000
0
500
1000
1500
2000

GENRE: HORROR


File Edit Selection View Go Run Terminal Help
idk.py - Assignment - Visual Studio Code
PROBLEMS 35 OUTPUT DEBUG CONSOLE TERMINAL SQL CONSOLE
Code
master* ⊗ 0 ⚠ 35 Connect Ln 157, Col 23 Spaces: 4 UTF-8 CRLF Python 3.10.9 64-bit (microsoft store) Port : 5500 Prettier

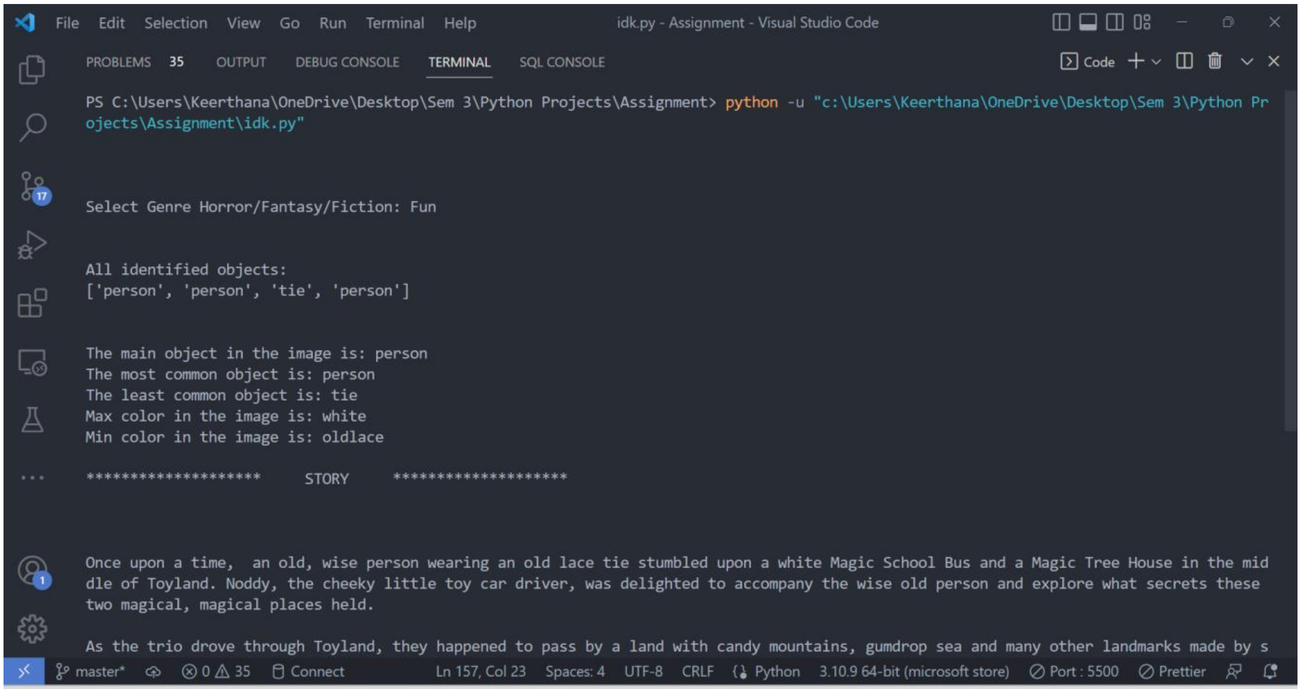
```
PS C:\Users\Keerthana\OneDrive\Desktop\Sem 3\Python Projects\Assignment> python -u "c:\Users\Keerthana\OneDrive\Desktop\Sem 3\Python Pr
ojects\Assignment\idk.py"



Select Genre Horror/Fantasy/Fiction: Horror


All identified objects:
['person', 'person', 'tie', 'person']


The main object in the image is: person
The most common object is: person
The least common object is: tie
Max color in the image is: white
Min color in the image is: oldlace

********************     STORY     ********************



The young person standing in the center of the room wore a stark white dress and had old lace gloves clasped in her hands. She felt uns
teady, her arms too short to reach any of the furniture. Despite it being a warm, dank summer day, the flowers surrounding her appeared
 to be wilting at an accelerated rate, the petals almost flowing from the vase.

Suddenly the door opened and in stepped an older person, their appearance impeccable in a suit of black and pale blue, their hands held
```


File Edit Selection View Go Run Terminal Help
idk.py - Assignment - Visual Studio Code
PROBLEMS 35 OUTPUT DEBUG CONSOLE TERMINAL SQL CONSOLE
Code
master* ⊗ 0 ⚠ 35 Connect Ln 157, Col 23 Spaces: 4 UTF-8 CRLF Python 3.10.9 64-bit (microsoft store) Port : 5500 Prettier

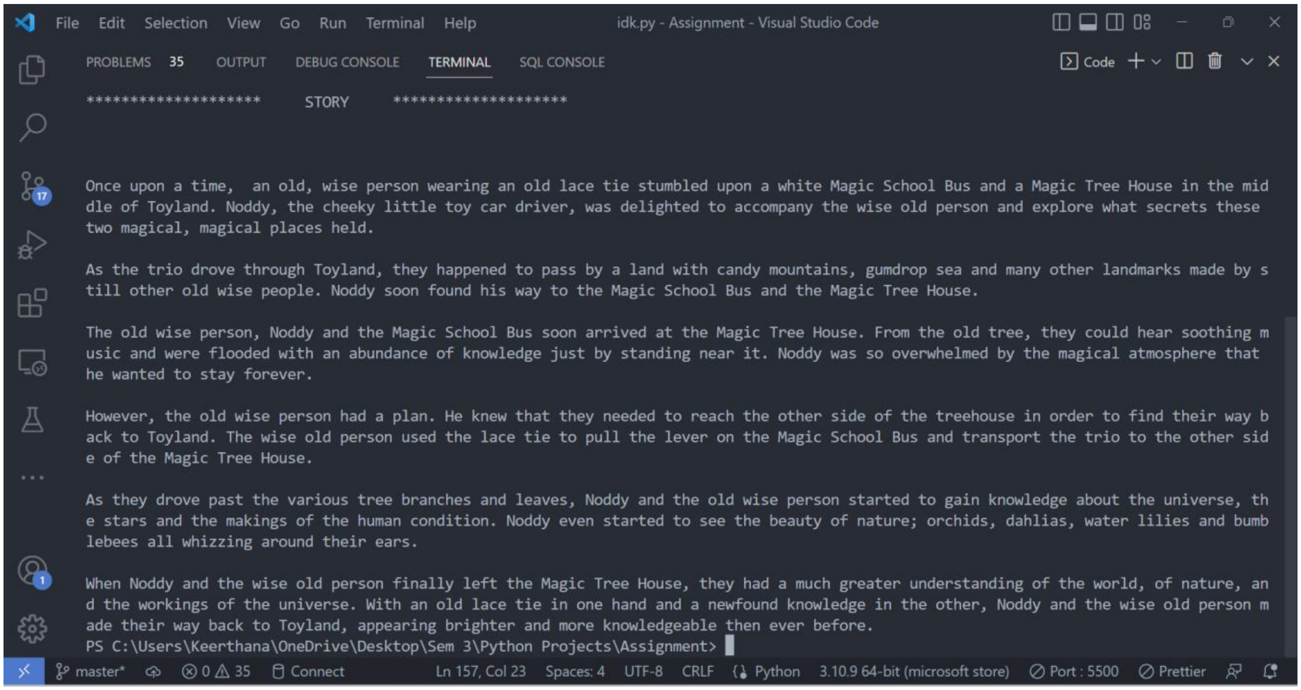
```
['person', 'person', 'tie', 'person']


The main object in the image is: person
The most common object is: person
The least common object is: tie
Max color in the image is: white
Min color in the image is: oldlace

********************     STORY     ********************



The young person standing in the center of the room wore a stark white dress and had old lace gloves clasped in her hands. She felt uns
teady, her arms too short to reach any of the furniture. Despite it being a warm, dank summer day, the flowers surrounding her appeared
 to be wilting at an accelerated rate, the petals almost flowing from the vase.

Suddenly the door opened and in stepped an older person, their appearance impeccable in a suit of black and pale blue, their hands held
 loosely at their sides. A red tie hung around their neck, a stark contrast to the otherwise monotone colour schemes.

In one fluid movement, the old person crossed the room to the young girl, never breaking eye contact. As they drew closer and closer to
 her, the young girl felt a chill of fear begin to seep into her skin. The old person didn't speak, they just stared; unrelenting and u
nnerving. Finally, they spoke, the croaky voice ringing out in the silence.

"My name is Mr. White," they said, the old lace of the dress rustling slightly in the still air. "We have been expecting you... I can g
ive you a tie that will never come undone."
PS C:\Users\Keerthana\OneDrive\Desktop\Sem 3\Python Projects\Assignment> 
```

GENRE: FUN

(If any option other than given three are selected, a fun story based on novels 'Magic School Bus', 'Noddy Goes to Toyland' and 'Magic Tree House' is generated.)

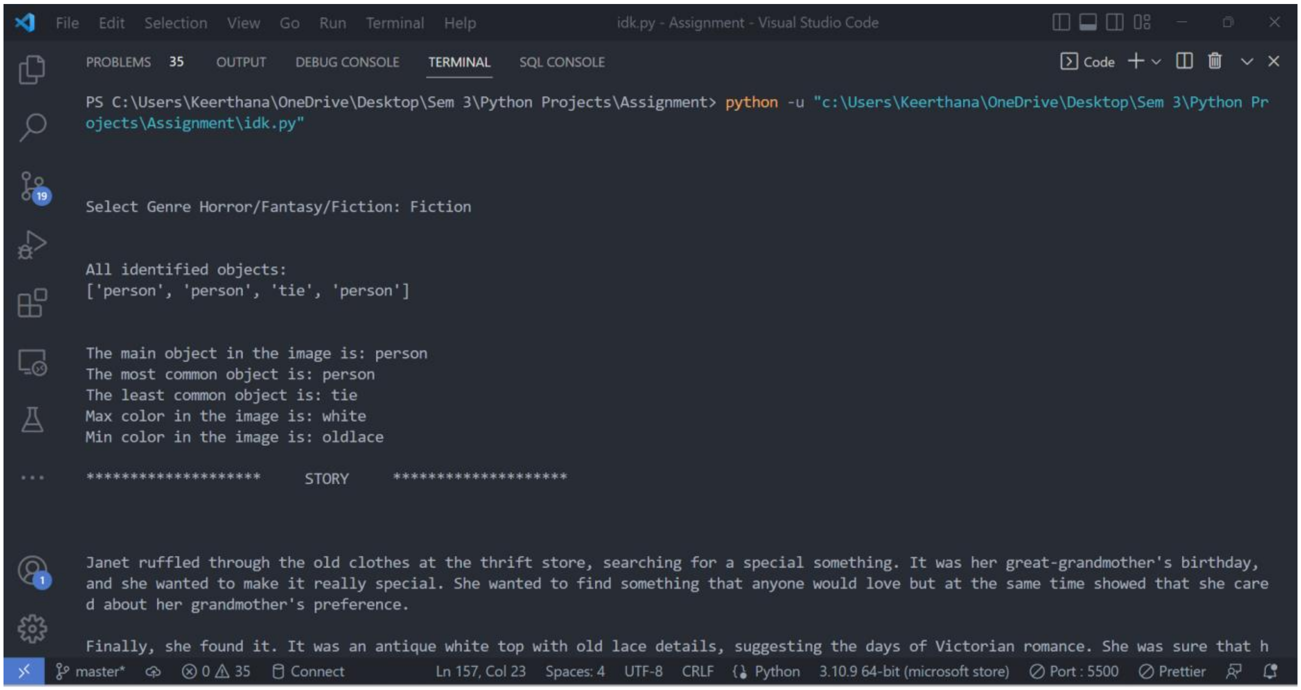

File Edit Selection View Go Run Terminal Help
idk.py - Assignment - Visual Studio Code
PROBLEMS 35 OUTPUT DEBUG CONSOLE TERMINAL SQL CONSOLE
Code
master* ⊗ 0 ⚠ 35 Connect Ln 157, Col 23 Spaces: 4 UTF-8 CRLF Python 3.10.9 64-bit (microsoft store) Port : 5500 Prettier

```
PS C:\Users\Keerthana\OneDrive\Desktop\Sem 3\Python Projects\Assignment> python -u "c:\Users\Keerthana\OneDrive\Desktop\Sem 3\Python Pr
ojects\Assignment\idk.py"


Select Genre Horror/Fantasy/Fiction: Fun


All identified objects:
['person', 'person', 'tie', 'person']


The main object in the image is: person
The most common object is: person
The least common object is: tie
Max color in the image is: white
Min color in the image is: oldlace

********************     STORY     ********************



Once upon a time,  an old, wise person wearing an old lace tie stumbled upon a white Magic School Bus and a Magic Tree House in the mid
dle of Toyland. Noddy, the cheeky little toy car driver, was delighted to accompany the wise old person and explore what secrets these
two magical, magical places held.

As the trio drove through Toyland, they happened to pass by a land with candy mountains, gumdrop sea and many other landmarks made by s
```

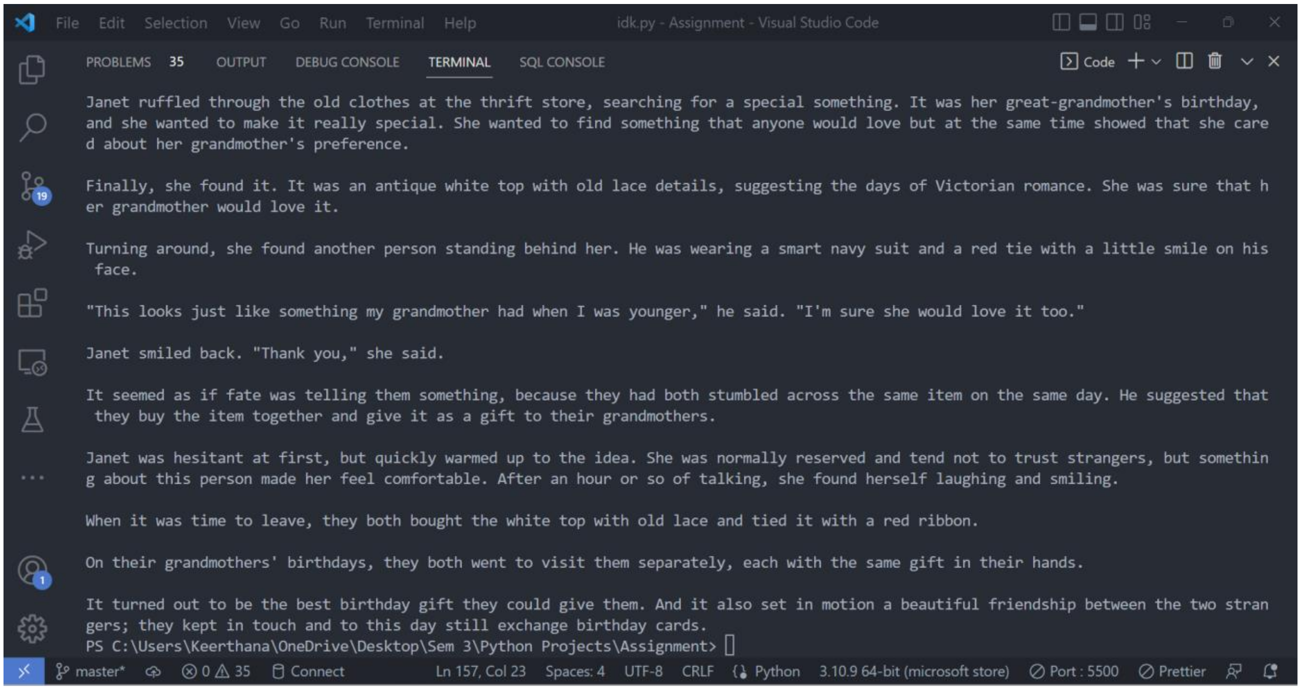

File Edit Selection View Go Run Terminal Help
idk.py - Assignment - Visual Studio Code
PROBLEMS 35 OUTPUT DEBUG CONSOLE TERMINAL SQL CONSOLE
Code
master* ⊗ 0 ⚠ 35 Connect Ln 157, Col 23 Spaces: 4 UTF-8 CRLF Python 3.10.9 64-bit (microsoft store) Port : 5500 Prettier

```
*******************    STORY    *******************



Once upon a time,  an old, wise person wearing an old lace tie stumbled upon a white Magic School Bus and a Magic Tree House in the mid
dle of Toyland. Noddy, the cheeky little toy car driver, was delighted to accompany the wise old person and explore what secrets these
two magical, magical places held.

As the trio drove through Toyland, they happened to pass by a land with candy mountains, gumdrop sea and many other landmarks made by s
till other old wise people. Noddy soon found his way to the Magic School Bus and the Magic Tree House.

The old wise person, Noddy and the Magic School Bus soon arrived at the Magic Tree House. From the old tree, they could hear soothing m
usic and were flooded with an abundance of knowledge just by standing near it. Noddy was so overwhelmed by the magical atmosphere that
he wanted to stay forever.

However, the old wise person had a plan. He knew that they needed to reach the other side of the treehouse in order to find their way b
ack to Toyland. The wise old person used the lace tie to pull the lever on the Magic School Bus and transport the trio to the other sid
e of the Magic Tree House.

As they drove past the various tree branches and leaves, Noddy and the old wise person started to gain knowledge about the universe, th
e stars and the makings of the human condition. Noddy even started to see the beauty of nature; orchids, dahlias, water lilies and bumb
lebees all whizzing around their ears.

When Noddy and the wise old person finally left the Magic Tree House, they had a much greater understanding of the world, of nature, an
d the workings of the universe. With an old lace tie in one hand and a newfound knowledge in the other, Noddy and the wise old person m
ade their way back to Toyland, appearing brighter and more knowledgeable then ever before.
PS C:\Users\Keerthana\OneDrive\Desktop\Sem 3\Python Projects\Assignment>
```

GENRE: FICTION

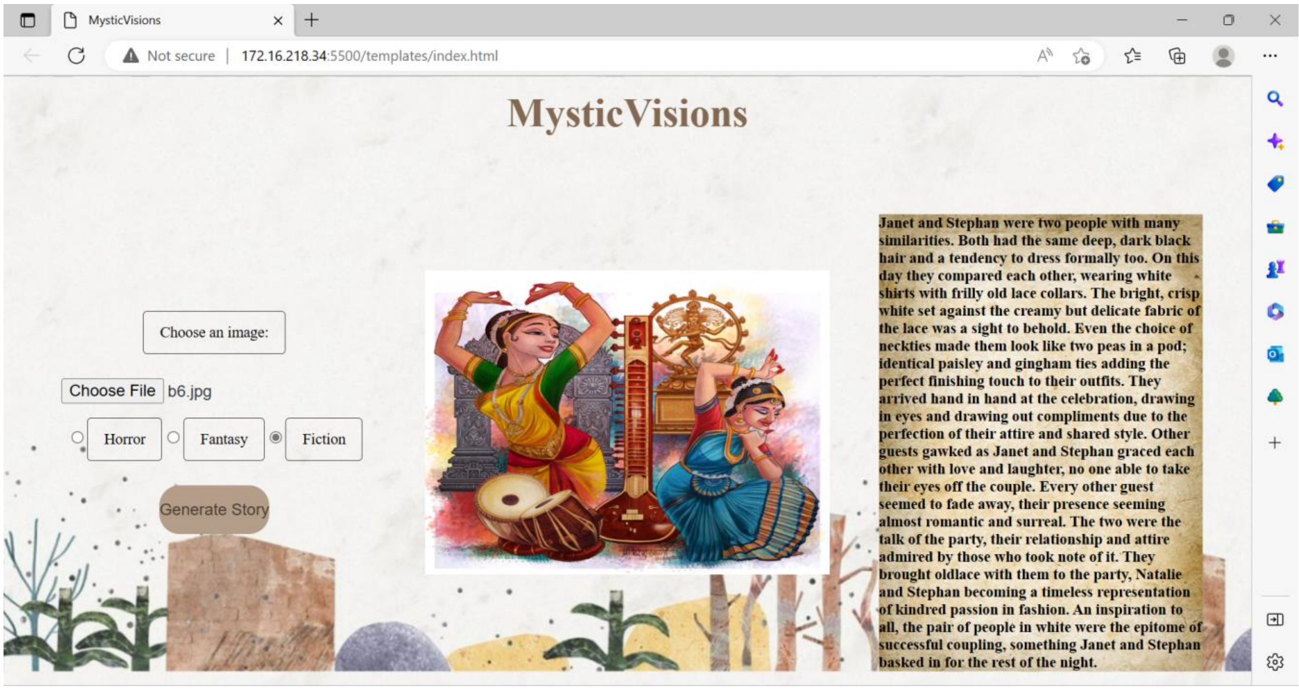

File Edit Selection View Go Run Terminal Help
idk.py - Assignment - Visual Studio Code
PROBLEMS 35 OUTPUT DEBUG CONSOLE TERMINAL SQL CONSOLE
Code
master* ⊗ 0 ⚠ 35 Connect Ln 157, Col 23 Spaces: 4 UTF-8 CRLF Python 3.10.9 64-bit (microsoft store) Port : 5500 Prettier

```
PS C:\Users\Keerthana\OneDrive\Desktop\Sem 3\Python Projects\Assignment> python -u "c:\Users\Keerthana\OneDrive\Desktop\Sem 3\Python Pr
ojects\Assignment\idk.py"



Select Genre Horror/Fantasy/Fiction: Fiction


All identified objects:
['person', 'person', 'tie', 'person']


The main object in the image is: person
The most common object is: person
The least common object is: tie
Max color in the image is: white
Min color in the image is: oldlace
*******************    STORY    *******************



Janet ruffled through the old clothes at the thrift store, searching for a special something. It was her great-grandmother's birthday,
and she wanted to make it really special. She wanted to find something that anyone would love but at the same time showed that she care
d about her grandmother's preference.

Finally, she found it. It was an antique white top with old lace details, suggesting the days of Victorian romance. She was sure that h
```


File Edit Selection View Go Run Terminal Help
idk.py - Assignment - Visual Studio Code
PROBLEMS 35
OUTPUT
DEBUG CONSOLE
TERMINAL
SQL CONSOLE
Code
master*
0 35
Connect
Ln 157, Col 23 Spaces: 4 UTF-8 CRLF Python 3.10.9 64-bit (microsoft store) Port : 5500 Prettier

```
Janet ruffled through the old clothes at the thrift store, searching for a special something. It was her great-grandmother's birthday,
and she wanted to make it really special. She wanted to find something that anyone would love but at the same time showed that she care
d about her grandmother's preference.

Finally, she found it. It was an antique white top with old lace details, suggesting the days of Victorian romance. She was sure that h
er grandmother would love it.

Turning around, she found another person standing behind her. He was wearing a smart navy suit and a red tie with a little smile on his
 face.

"This looks just like something my grandmother had when I was younger," he said. "I'm sure she would love it too."

Janet smiled back. "Thank you," she said.

It seemed as if fate was telling them something, because they had both stumbled across the same item on the same day. He suggested that
 they buy the item together and give it as a gift to their grandmothers.

Janet was hesitant at first, but quickly warmed up to the idea. She was normally reserved and tend not to trust strangers, but somethin
g about this person made her feel comfortable. After an hour or so of talking, she found herself laughing and smiling.

When it was time to leave, they both bought the white top with old lace and tied it with a red ribbon.

On their grandmothers' birthdays, they both went to visit them separately, each with the same gift in their hands.

It turned out to be the best birthday gift they could give them. And it also set in motion a beautiful friendship between the two stran
gers; they kept in touch and to this day still exchange birthday cards.
PS C:\Users\Keerthana\OneDrive\Desktop\Sem 3\Python Projects\Assignment> 
```

FINAL OUTPUT PAGE:


MysticVisions
Not secure | 172.16.218.34:5500/templates/index.html
MysticVisions
Choose an image:
Generate Story

Choose File b6.jpg

○ Horror ○ Fantasy ● Fiction

Janet and Stephan were two people with many similarities. Both had the same deep, dark black hair and a tendency to dress formally too. On this day they compared each other, wearing white shirts with frilly old lace collars. The bright, crisp white set against the creamy but delicate fabric of the lace was a sight to behold. Even the choice of neckties made them look like two peas in a pod; identical paisley and gingham ties adding the perfect finishing touch to their outfits. They arrived hand in hand at the celebration, drawing in eyes and drawing out compliments due to the perfection of their attire and shared style. Other guests gawked as Janet and Stephan graced each other with love and laughter, no one able to take their eyes off the couple. Every other guest seemed to fade away, their presence seeming almost romantic and surreal. The two were the talk of the party, their relationship and attire admired by those who took note of it. They brought oldlace with them to the party, Natalie and Stephan becoming a timeless representation of kindred passion in fashion. An inspiration to all, the pair of people in white were the epitome of successful coupling, something Janet and Stephan basked in for the rest of the night.

CONCLUSION:

As shown above ‘MysticVisions’ works flexibly with different images and same genre, same image and different genre or both different.
It can handle any kinds of file upload errors or diverse images and generate a ‘Mystic’ story for the user.

RELATED STUDIES AND REFERENCES:

- OPENAI MODAL USAGE: https://github.com/openai/openai-quickstart-python
- NPM DOCUMENTATION: https://docs.npmjs.com/getting-started
- FLASK DOCUMENTATION: https://flask.palletsprojects.com/en/2.2.x/quickstart/#a-minimal-application
- FLASK HTTP METHODS: https://www.youtube.com/watch?v=9MHYHgh4jYc&list=RDCMUC4JX40jDee_tINbkjycV4Sg&start_radio=1&t=617s
- FLASK BLUEPRINTS: https://www.youtube.com/watch?v=WteIH6J9v64&list=PLzMcBGfZo4-n4vJJybUVV3Un_NFS5EOgX&index=10
- UPLOAD LOCAL IMAGE WITH PYTHON AND FLASK: https://tutorial101.blogspot.com/2021/04/python-flask-upload-and-display-image.html
- FORMS IN FLASK: https://vegibit.com/how-to-use-forms-in-python-flask/#:~:text=Data%20associated%20with%20an%20HTML,args.&text=The%20code%20just%20above%20uses,%3E%2C%20which%20exists%20in%20home.

- OPENAI API USAGE BLOGS:
  1. https://medium.com/nerd-for-tech/create-ai-application-in-minutes-with-openai-api-5e84bd3ec5d0
  2. https://accessibleai.dev/post/generating_text_with_gpt_and_python/

- OPENAI API DOCUMENTATION: https://beta.openai.com/docs/api-reference/edits/create
- SIMILAR APP WITH ML MODAL: https://huggingface.co/spaces/bipin/image2story
- SITES REFERRED FOR OBJECT DETECTION FUNCTION:
    1. https://towardsdatascience.com/object-detection-with-10-lines-of-code-d6cb4d86f606
    2. https://towardsdatascience.com/object-detection-and-tracking-in-pytorch-b3cf1a696a98
    3. https://towardsdatascience.com/step-by-step-r-cnn-implementation-from-scratch-in-python-e97101ccde55
    4. https://pjreddie.com/darknet/yolo/
    5. https://medium.com/python-in-plain-english/image-captioning-with-an-end-to-end-transformer-network-8f39e1438cd4
    6. https://keras.io/examples/vision/image_captioning/
    7. https://www.geeksforgeeks.org/image-captioning-using-python/
    8. https://github.com/achen353/Image-Caption-Generator
    9. https://www.topcoder.com/thrive/articles/python-for-image-recognition-opencv
    10. https://developers.google.com/mediapipe/solutions/vision/object_detector/python
    11. https://dontrepeatyourself.org/post/yolov4-custom-object-detection-with-opencv-and-python/
    12. https://github.com/chandravenky/Computer-Vision---Object-Detection-in-Python

THANK YOU

GROUP
26

2021BCS0053- MURALIDHAR P

2021BCS0081- SAI SATHVIK P

2021BCS0115- KARTHEEK V

2021BCS0185- KEERTHANA NNL