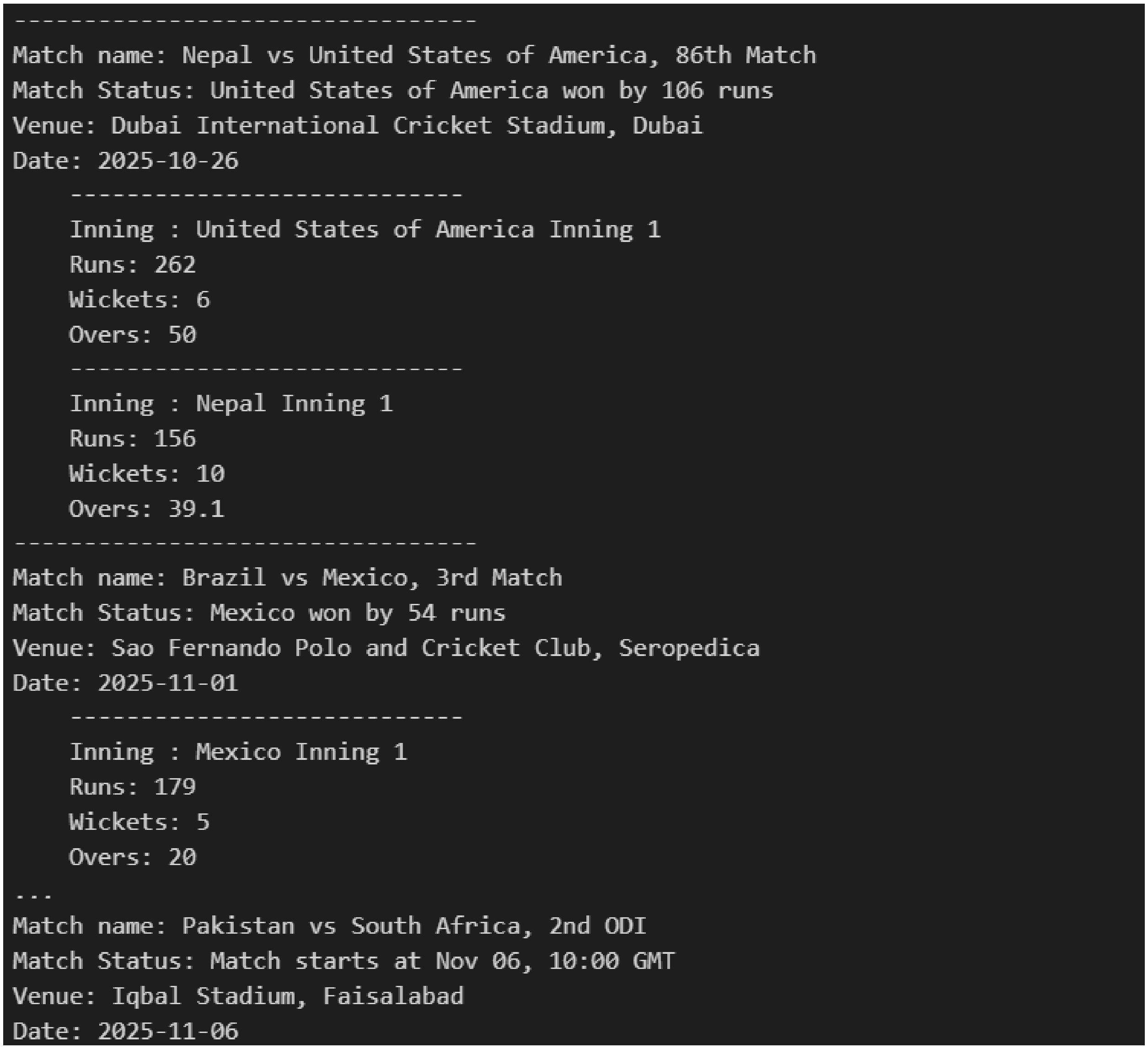
Shahzaib Zaheer, 24K-0040
PAI Assignment 2

Question 1 code:

```
import numpy, json, requests
with open('api.text', 'r') as APIFILE:
    url = APIFILE.read()
    print(url)
try:
    response = requests.get(url)
except requests.exceptions.RequestException as e:
    print(f"Error occured: {str(e)}")
print(response.status_code)
if response.status_code != 200:
    print(f"Http error: {response.status_code}, text: {response.text}")
res = response.json()
#API INFO METADATA

info = res.get("info", [])
statusOFAPI = res.get('status')
print(f"Api Info: {info}")
print(f"Status: {statusOFAPI}")

if res.get('status') != "success":
    error = res.get('reason')
    print(f"Error: {error}")
elif "data" not in res:
    print(f"No Data available for match")
else:
    print("Match data available")
content = res.get("data", [])
for matches in content:
    print("---------------------------------")
    print(f"Match name: {matches.get("name")}")
    print(f"Match Status: {matches.get("status")}")
    print(f"Venue: {matches.get("venue")}")
    print(f"Date: {matches.get("date")}")
    if "score" in matches:
        score = matches.get("score", [])
        for s in score:
            print("    ----------------------------")
            print(f"    Inning : {s.get('inning')}")
            print(f"    Runs: {s.get('r')}")
            print(f"    Wickets: {s.get('w')}")
            print(f"    Overs: {s.get('o')}")
```

Output:

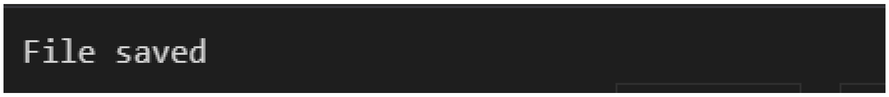


```
--------------------------------
Match name: Nepal vs United States of America, 86th Match
Match Status: United States of America won by 106 runs
Venue: Dubai International Cricket Stadium, Dubai
Date: 2025-10-26
    ----------------------------
    Inning : United States of America Inning 1
    Runs: 262
    Wickets: 6
    Overs: 50
    ----------------------------
    Inning : Nepal Inning 1
    Runs: 156
    Wickets: 10
    Overs: 39.1
--------------------------------
Match name: Brazil vs Mexico, 3rd Match
Match Status: Mexico won by 54 runs
Venue: Sao Fernando Polo and Cricket Club, Seropedica
Date: 2025-11-01
    ----------------------------
    Inning : Mexico Inning 1
    Runs: 179
    Wickets: 5
    Overs: 20
...
Match name: Pakistan vs South Africa, 2nd ODI
Match Status: Match starts at Nov 06, 10:00 GMT
Venue: Iqbal Stadium, Faisalabad
Date: 2025-11-06
```

Question 2 code:

```
import json, numpy as np
csvData = []
with open("sensor_data.csv", 'r') as CSVData:
    row = []
    for line in CSVData:
        val = line.strip().split(',')
        csvData.append(val)
print(csvData)
npArray = np.array(csvData)
print("Sample of original data:")
print(npArray[:1][:2])
npArrayFloat = npArray.astype(float)

npArrayFloat[npArrayFloat == -999] = np.nan
npArrayFloat[npArrayFloat < 0] = np.nan
npArrayFloat[npArrayFloat > 100] = np.nan
np.set_printoptions(precision=2)

colMean = np.nanmean(npArrayFloat, axis=0)
print(f"Average Mositure of Each Sensor: {colMean[:2]}")
rowMean = np.nanmean(npArrayFloat, axis=1)
print(f"Average Mositure for Each Hour: {rowMean[:2]}")

invalidReading = np.sum(np.isnan(npArrayFloat), axis =0)
worstSensor = np.argmax(invalidReading)

print(f"Worst col reading: {worstSensor}")
minData = np.nanmin(npArrayFloat)
maxData = np.nanmax(npArrayFloat)

normalize = (npArrayFloat - minData) / (maxData - minData)

np.savetxt('sensorDataNormalized.csv', normalize, fmt= '%.3f')
print("File saved")
```

Output:



```
File saved
```

(file is is saved as sensorDataNormalized and is submitted)

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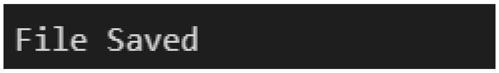
Question 3 code:

```
import pandas as pd
df = pd.read_csv("Titanic-Dataset.csv")

#print(df.head())

print("Inspection Report:")
for column in df.columns:
    dtype = df[column].dtype
    missing = df[column].isnull().sum()
    missingPerc = (missing / len(df)) * 100

    print(f"{column}: {dtype}, Missing: {missingPerc:.2f}%")

df['Age'] =
df["Age"].fillna(df.groupby(["Pclass","Sex"])["Age"].transform("median"))

df["Embarked"] = df["Embarked"].fillna(df["Embarked"].mode())

df.drop("Cabin", axis = 1)
df["Family Size"] = df["SibSp"] + df["Parch"]
df["IsAlone"] = df["Family Size"].apply(lambda x: 1 if x==0 else 0)
df
df['Age'] = df['Age'].astype(int)
df.dtypes
filename = "titanic_cleaned.csv"
df.to_csv(filename, index=False)
```

Output:



```
File Saved
```

File is saved as titanic_cleaned and is submitted.

Question 4 code:

```
import pandas as pd, json
df1 = pd.read_csv("titanic_cleaned.csv")
df2 = pd.read_csv("ticket_fares.csv")
```

```
mergeData = pd.merge(df1,df2, on = "Ticket", how = "left", suffixes=(","Fare"))
mergeData
#hypothesis 1
mergeData["Age Group"] = pd.cut(mergeData["Age"]
                               ,bins = [0,12,19,59,100]
                               ,labels=["Child", "Teen", "Adults", "Senior"])
survivalbyGroup = mergeData.groupby(["Sex", "Age Group"])["Survived"].mean()
* 100
survivalbyGroup
try:
    with open("reports.txt", "a+") as reportFile:
        reportFile.write("-" * 50)
        reportFile.write(f"\nThe Data supports the Women and Children Hypothesis
\nProof:")
        reportFile.write(f"\nSurvival Rate by Groups:\n\n {survivalbyGroup}")
        reportFile.write(f"\nFrom the above data we can see that Women and
Children have higher survival rate than Mens, Hence it support this Hypothesis")
        reportFile.write(f"\n")
except Exception as e:
    print("Error", str(e))
survivalByCLass = mergeData.groupby("Pclass")["Survived"].mean() * 100
mergeData["FareBin"] = pd.qcut(mergeData["Fare"], q=4, labels=["Low",
"Medium", "High", "Very High"])
survivalByFarebin = mergeData.groupby("FareBin")["Survived"].mean()
try:
    with open("reports.txt", "a+") as reportFile1:
        reportFile1.write("-" * 50)
        reportFile1.write(f"\nThe Data Shows that Wealthy have higher survival
Rate\nProof:")
        reportFile1.write(f"\nSurvival Rate by Class:\n\n {survivalByCLass}")
        reportFile1.write(f"\nSurvival Rate by Fare:\n\n {survivalByFarebin} ")
        reportFile1.write(f"\nFrom the above data It is clear that Wealthier had
Greater Survival Rate\n")
        reportFile1.write("-" * 50)
except Exception as e:
    print("Error", str(e))
```

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Output:

The Output: report.txt is submitted.