DAA Assignment -1

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(Implements the following problems using C++ / Python)

1 .Given a row wise sorted matrix of size **R*C** where R and C are always **odd**, find the median of the matrix. **5Marks**

CODE:

```
R=int(input("Enter the number of rows:"))

C=int(input("Enter the number of columns:"))

matrix=[]

for i in range(R):

   a =[]

   for j in range(C):

      a.append(int(input()))

   matrix.append(a)

matrix.sort()

import numpy as nk

h=nk.median(matrix)

print('Sorting matrix elements gives us')

print(matrix)

print(f'Hence {h} is median')
```

Test Case 1:

```
Input:
R = 3, C = 3
M = [[1, 3, 5],
     [2, 6, 9],
     [3, 6, 9]]
Output: 5
Explanation: Sorting matrix elements gives
us {1,2,3,3,5,6,6,9,9}. Hence, 5 is median.
```

EXPLORER

PYTHON

python 1

Get Started | python 1

python > ...

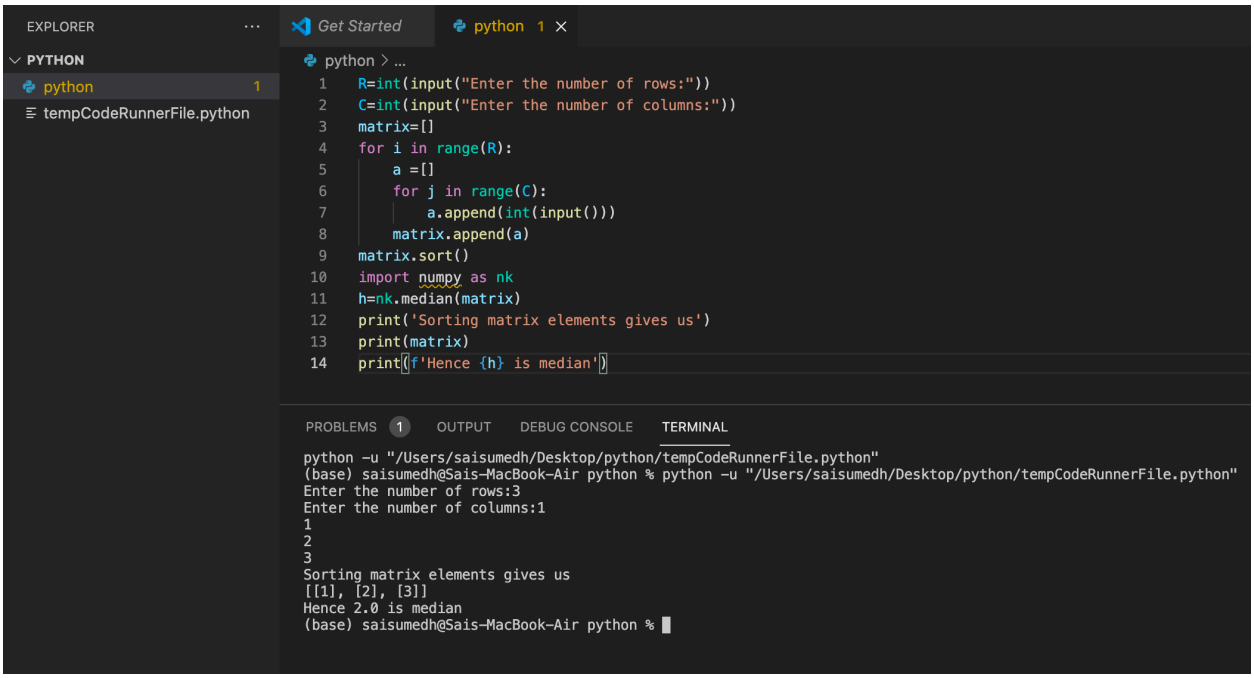
```python
R=int(input("Enter the number of rows:"))
C=int(input("Enter the number of columns:"))
matrix=[]
for i in range(R):
    a =[]
    for j in range(C):
        a.append(int(input()))
    matrix.append(a)
matrix.sort()
import numpy as nk
h=nk.median(matrix)
print('Sorting matrix elements gives us')
print(matrix)
print(f'Hence {h} is median')
```

PROBLEMS 1 | OUTPUT | DEBUG CONSOLE | TERMINAL

```
python -u "/Users/saisumedh/Desktop/python/python"
(base) saisumedh@Sais-MacBook-Air python % python -u "/Users/saisumedh/Desktop/python/python"
Enter the number of rows:3
Enter the number of columns:3
1
3
5
2
6
9
3
6
9
Sorting matrix elements gives us
[[1, 3, 5], [2, 6, 9], [3, 6, 9]]
Hence 5.0 is median
(base) saisumedh@Sais-MacBook-Air python %
```

Test Case 2:

```
Input:
R = 3, C = 1
M = [[1], [2], [3]]
Output: 2
Explanation: Sorting matrix elements gives
us {1,2,3}. Hence, 2 is median.
```



- **Constraints:**
  1 <= R, C <= 400
  1 <= matrix[i][j] <= 2000

2. Given the arrival and departure times of all trains that reach a railway station, the task is to find the minimum number of platforms required for the railway station so that no train waits. We are given two arrays that represent the arrival and departure times of trains that stop. **5Marks**

CODE:

```
arrival=list(map(int,input().split()))

departure=list(map(int,input().split()))

n=len(arrival)

arrival.sort()

departure.sort()

platforms=1

required_platforms=1

i=1

j=0

while i<n and j<n:

   if arrival[i]<=departure[j]:

      platforms=platforms+1

      i=i+1

   else:

      platforms=platforms-1

      j=j+1

   required_platforms=max(required_platforms, platforms)

print(required_platforms)
```

Test case 1

Input: *arr[] = {9:00, 9:40, 9:50, 11:00, 15:00, 18:00}, dep[] = {9:10, 12:00, 11:20, 11:30, 19:00, 20:00}*

Output: *3*

EXPLORER

PYTHON

python

tempCodeRunnerFile.python

Get Started | python

python > ...

```python
arrival=list(map(int,input().split()))
departure=list(map(int,input().split()))
n=len(arrival)
arrival.sort()
departure.sort()
platforms=1
required_platforms=1
i=1
j=0
while i<n and j<n:
    if arrival[i]<=departure[j]:
        platforms=platforms+1
        i=i+1
    else:
        platforms=platforms-1
        j=j+1
    required_platforms=max(required_platforms,platforms)
print(required_platforms)
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

```
python -u "/Users/saisumedh/Desktop/python/python"
(base) saisumedh@Sais-MacBook-Air python % python -u "/Users/saisumedh/Desktop/python/python"
900 940 950 1100 1500 1800
910 1200 1120 1130 1900 2000
3
(base) saisumedh@Sais-MacBook-Air python %
```

Explanation: *There are at-most three trains at a time (time between 9:40 to 12:00)*

Test case 2

Input: *arr[] = {9:00, 9:40}, dep[] = {9:10, 12:00}*

Output: *1*

EXPLORER

PYTHON

python

tempCodeRunnerFile.python

Get Started | python

python > ...

```python
arrival=list(map(int,input().split()))
departure=list(map(int,input().split()))
n=len(arrival)
arrival.sort()
departure.sort()
platforms=1
required_platforms=1
i=1
j=0
while i<n and j<n:
    if arrival[i]<=departure[j]:
        platforms=platforms+1
        i=i+1
    else:
        platforms=platforms-1
        j=j+1
    required_platforms=max(required_platforms,platforms)
print(required_platforms)
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

```
python -u "/Users/saisumedh/Desktop/python/tempCodeRunnerFile.python"
(base) saisumedh@Sais-MacBook-Air python % python -u "/Users/saisumedh/Desktop/python/tempCodeRunnerFile.python"
900 940
910 1200
1
(base) saisumedh@Sais-MacBook-Air python %
```