ALGORITHM TEST #2

Andy's boss says he needs to calculate the Median water volume every second. Assume that the water meter sensor has a resolution of 1 m3/s , and that the maximum water volume is 1000 m3/s. Ie, 0 <= V <= 1000 and V is an integer. Write a new algorithm that calculates M, the Median water volume every second.

Note: The value of V changes every second, so you need to use a loop to update A or M every second.

ANSWER :
Script below is a program I wrote using Python to simulate the calculation of average water volume through a pipe every second.

```python
import random
import time
from statistics import median


def get_volume_from_sensor():

    # Assume this is a function that return readings V from the sensor
    return random.randrange(1, 1000)



# Greetings
print("This is a program to simulate the calculation of median water volume
through a pipe every second")
input("Press enter to start\n")

# Preparing variables
arr = []
second = 0

while True:

    #Delay every loop for 1 second
    time.sleep(1)

    # Get new volume and prepare array
    second += 1
```
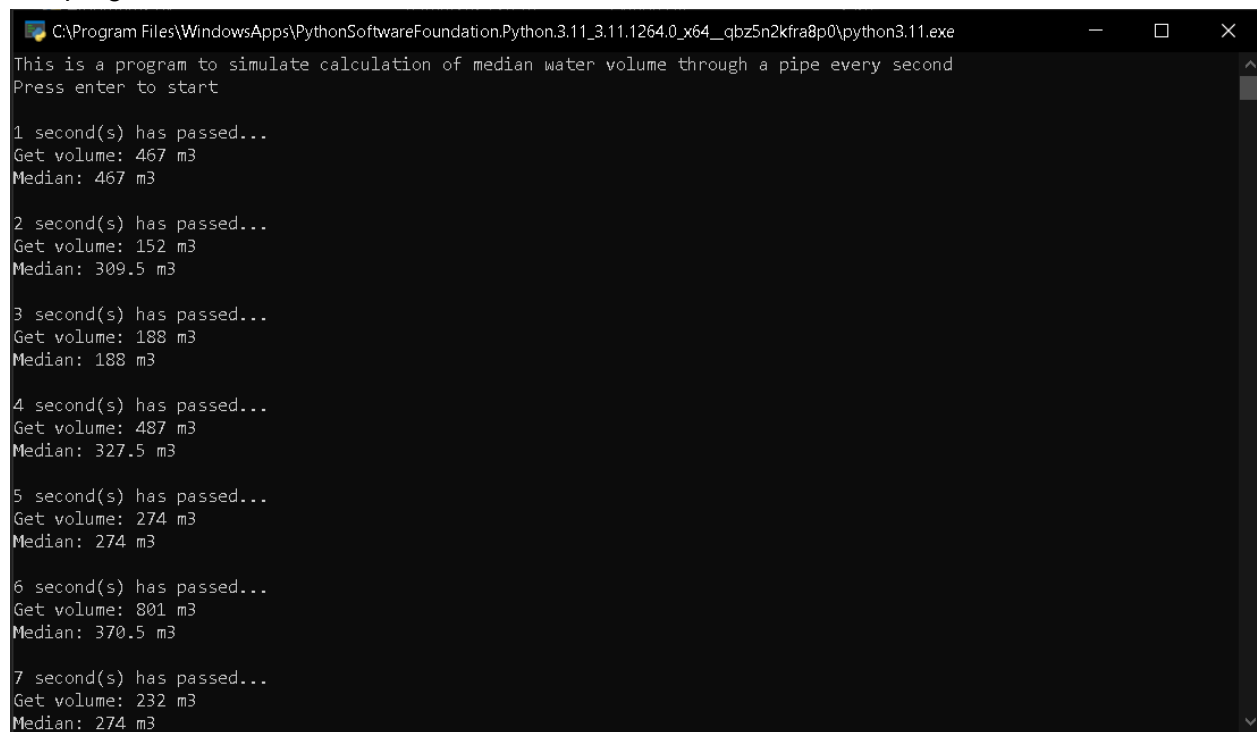
```python
    volume = get_volume_from_sensor()
    arr.append(volume)
    arr.sort()

    # Limit array length to save resources by removing the smallest and the
biggest value while keeping the closest value to the median untouched
    if len(arr) == 5:
        arr.pop(0)
        arr.pop(len(arr) - 1)

    # Calculate median
    med = median(arr)

    # Represent the results
    print(f"{second} second(s) has passed...")
    print(f"Get volume: {volume} m3")
    print(f"Median: {med} m3\n")
```

The program should look like this

This is a program to simulate calculation of median water volume through a pipe every second
Press enter to start

1 second(s) has passed...
Get volume: 467 m3
Median: 467 m3

2 second(s) has passed...
Get volume: 152 m3
Median: 309.5 m3

3 second(s) has passed...
Get volume: 188 m3
Median: 188 m3

4 second(s) has passed...
Get volume: 487 m3
Median: 327.5 m3

5 second(s) has passed...
Get volume: 274 m3
Median: 274 m3

6 second(s) has passed...
Get volume: 801 m3
Median: 370.5 m3

7 second(s) has passed...
Get volume: 232 m3
Median: 274 m3

After pressing "Enter" key, the program will start to generate a new random value of volume water while assuming it's a reading from a sensor. The median value is calculated immediately after the value generated using statistics library. Since an array is needed to calculate the median. I remove the smallest and the biggest value while keeping the closest value to the median untouched to prevent the array from becoming too long and consuming excessive resources while also keeping the median value uninterrupted. This process will repeat itself every second.