

DATA STRUCTURE AND ALGORITHM



LAB REPORT

Name	AREEBA FAROOQ
Registration Number	200901058
Batch & Section	BSCS 01 (SECTION A)
Instructor's Name	Sir Nadeem

DATE:25-10-2021

TASK 1

QUEUE IMPLEMENTATION USING NUMPY

SOLUTION

```
print("Queue implementation using Numpy")

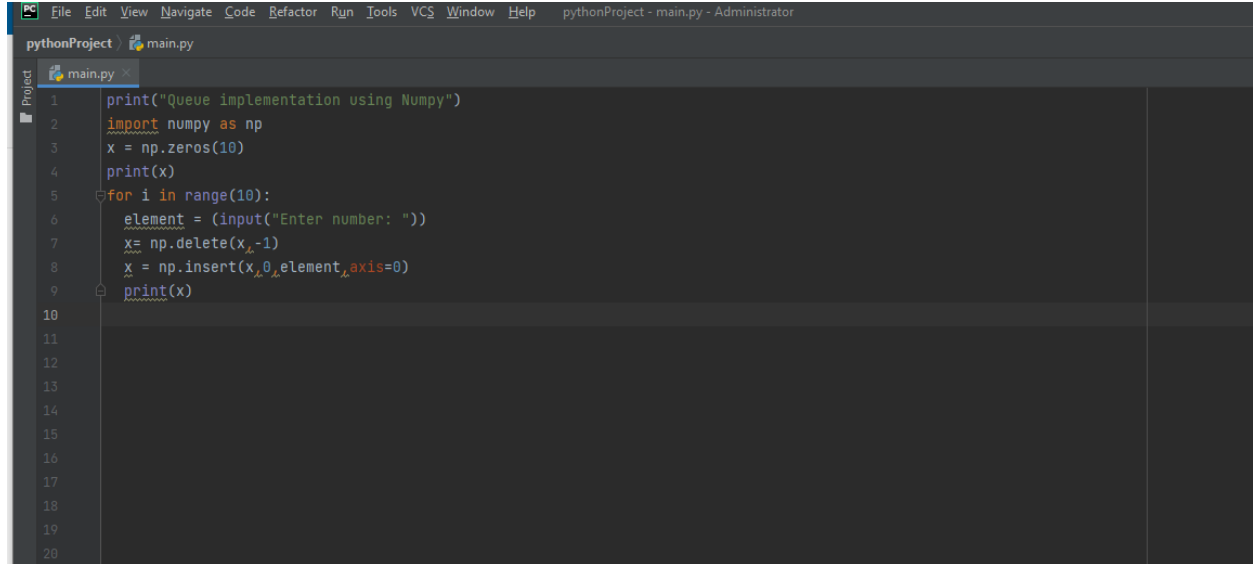
import numpy as np

x = np.zeros(5)

print(x)

for i in range(10):
    element = (input("Enter number: "))
    x= np.delete(x,-1)
    x = np.insert(x,0,element,axis=0)

print(x)
```

A screenshot of a code editor window titled 'pythonProject - main.py - Administrator'. The editor shows the same Python code as the previous block, with line numbers 1 through 20 on the left margin. The code implements a queue using NumPy arrays, printing the initial state, then performing a series of deletions and insertions in a loop, and finally printing the state again. The code is syntax-highlighted with colors: blue for print, purple for import, green for np, and red for input. The editor interface includes a menu bar at the top with options like File, Edit, View, Navigate, Code, Refactor, Run, Tools, VCS, Window, and Help. A project explorer on the left shows the file structure with 'main.py' selected.

```
1 print("Queue implementation using Numpy")
2 import numpy as np
3 x = np.zeros(10)
4 print(x)
5 for i in range(10):
6     element = (input("Enter number: "))
7     x= np.delete(x,-1)
8     x = np.insert(x,0,element,axis=0)
9     print(x)
10
11
12
13
14
15
16
17
18
19
20
```

```
Run: main
C:\Users\User\PycharmProjects\pythonProject\venv\Scripts\python.exe C:/Users/User/PycharmProjects/pythonProject/main.py
Queue implementation using Numpy
[0. 0. 0. 0. 0. 0. 0. 0. 0.]
Enter number: 1
[1. 0. 0. 0. 0. 0. 0. 0. 0.]
Enter number: 2
[2. 1. 0. 0. 0. 0. 0. 0. 0.]
Enter number: 3
[3. 2. 1. 0. 0. 0. 0. 0. 0.]
Enter number: 4
[4. 3. 2. 1. 0. 0. 0. 0. 0.]
Enter number: 5
[5. 4. 3. 2. 1. 0. 0. 0. 0.]
Enter number: 6
[6. 5. 4. 3. 2. 1. 0. 0. 0.]
Enter number: 7
[7. 6. 5. 4. 3. 2. 1. 0. 0.]
Enter number: 8
[8. 7. 6. 5. 4. 3. 2. 1. 0.]
Enter number: 9
[9. 8. 7. 6. 5. 4. 3. 2. 1.]
Enter number: 5
[5. 9. 8. 7. 6. 5. 4. 3. 2. 1.]
Process finished with exit code 0
```

QUEUE IMPLEMENTATION USING COLLECTION

SOLUTION

```
print("Queue implementation using Collections")

from collections import deque

x = deque()

print(x)

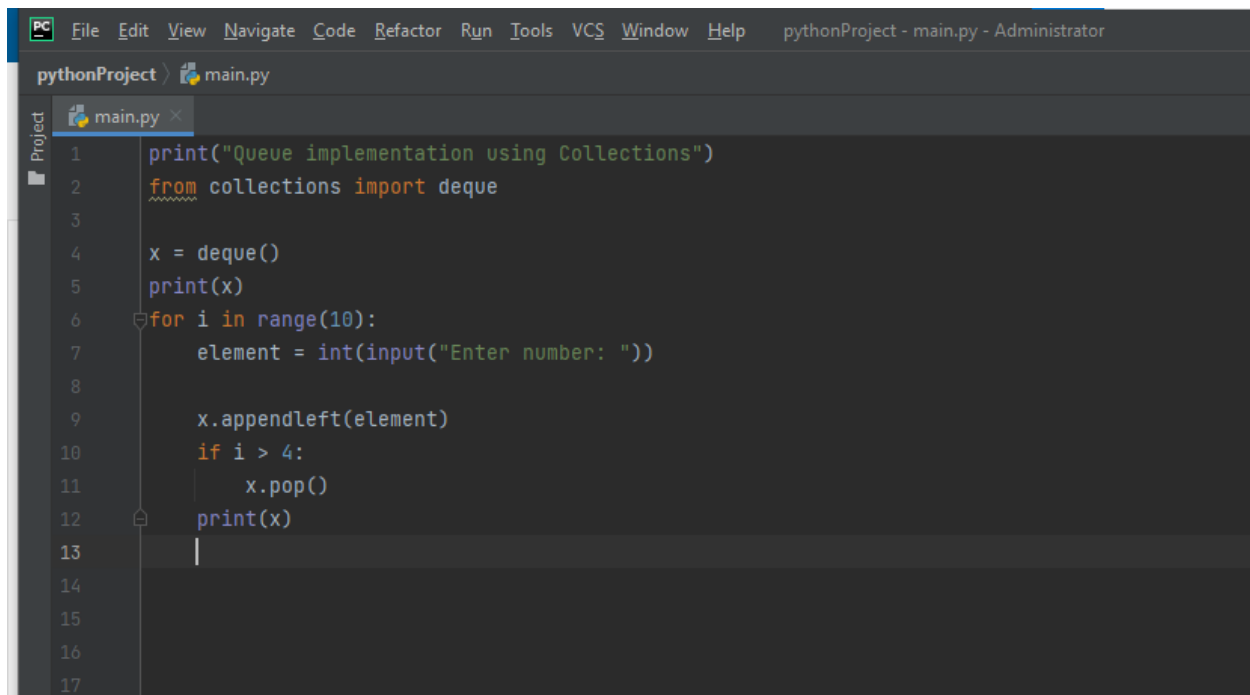
for i in range(10):
    element = int(input("Enter number: "))

    x.appendleft(element)

    if i > 4:
        x.pop()

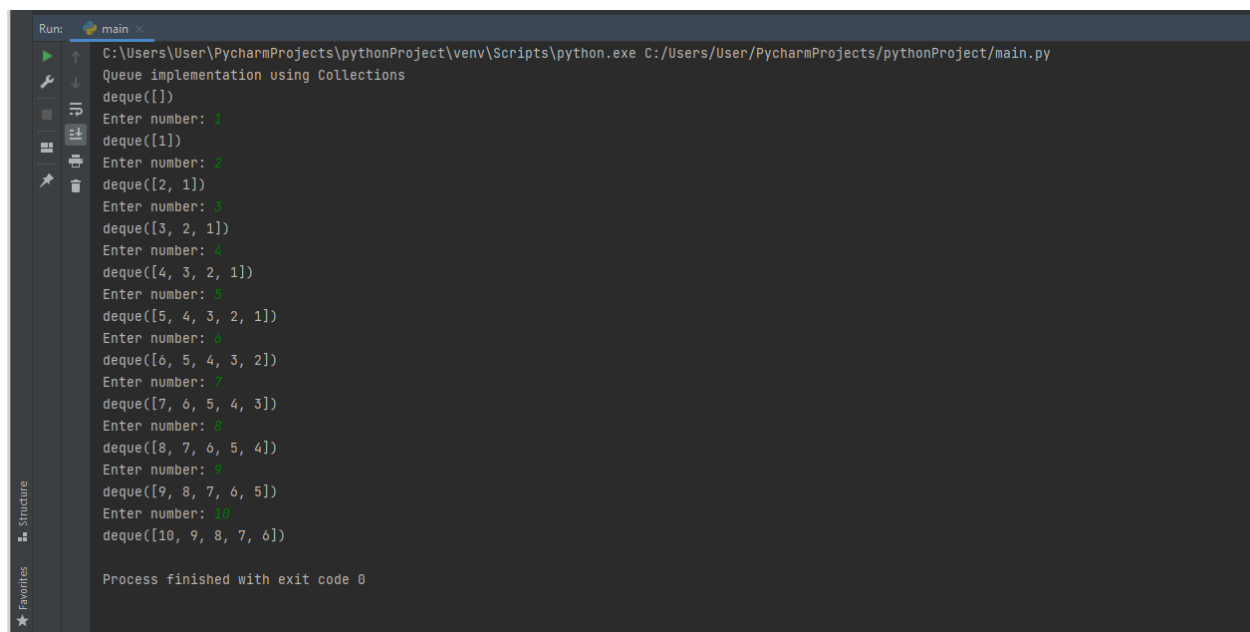
print(x)
```

OUTPUT



The screenshot shows a code editor window titled "pythonProject" with a file named "main.py" open. The code implements a queue using a deque from the collections module. It starts by printing "Queue implementation using Collections", then imports deque. A deque object x is created and printed. A loop runs 10 times, each time prompting the user to enter a number. The number is added to the left of the deque. If the deque's length is greater than 4, the element at the right end is removed. The deque is printed after each iteration.

```
1 print("Queue implementation using Collections")
2 from collections import deque
3
4 x = deque()
5 print(x)
6 for i in range(10):
7     element = int(input("Enter number: "))
8
9     x.appendleft(element)
10    if i > 4:
11        x.pop()
12    print(x)
13
14
15
16
17
```



The screenshot shows a terminal window titled "Run: main" displaying the output of the Python script. The output shows the deque's state after each iteration of the loop, with the number of elements increasing from 1 to 10. The process finished with exit code 0.

```
Run: main
C:\Users\User\PycharmProjects\pythonProject\venv\Scripts\python.exe C:/Users/User/PycharmProjects/pythonProject/main.py
Queue implementation using Collections
deque([])
Enter number: 1
deque([1])
Enter number: 2
deque([2, 1])
Enter number: 3
deque([3, 2, 1])
Enter number: 4
deque([4, 3, 2, 1])
Enter number: 5
deque([5, 4, 3, 2, 1])
Enter number: 6
deque([6, 5, 4, 3, 2])
Enter number: 7
deque([7, 6, 5, 4, 3])
Enter number: 8
deque([8, 7, 6, 5, 4])
Enter number: 9
deque([9, 8, 7, 6, 5])
Enter number: 10
deque([10, 9, 8, 7, 6])

Process finished with exit code 0
```