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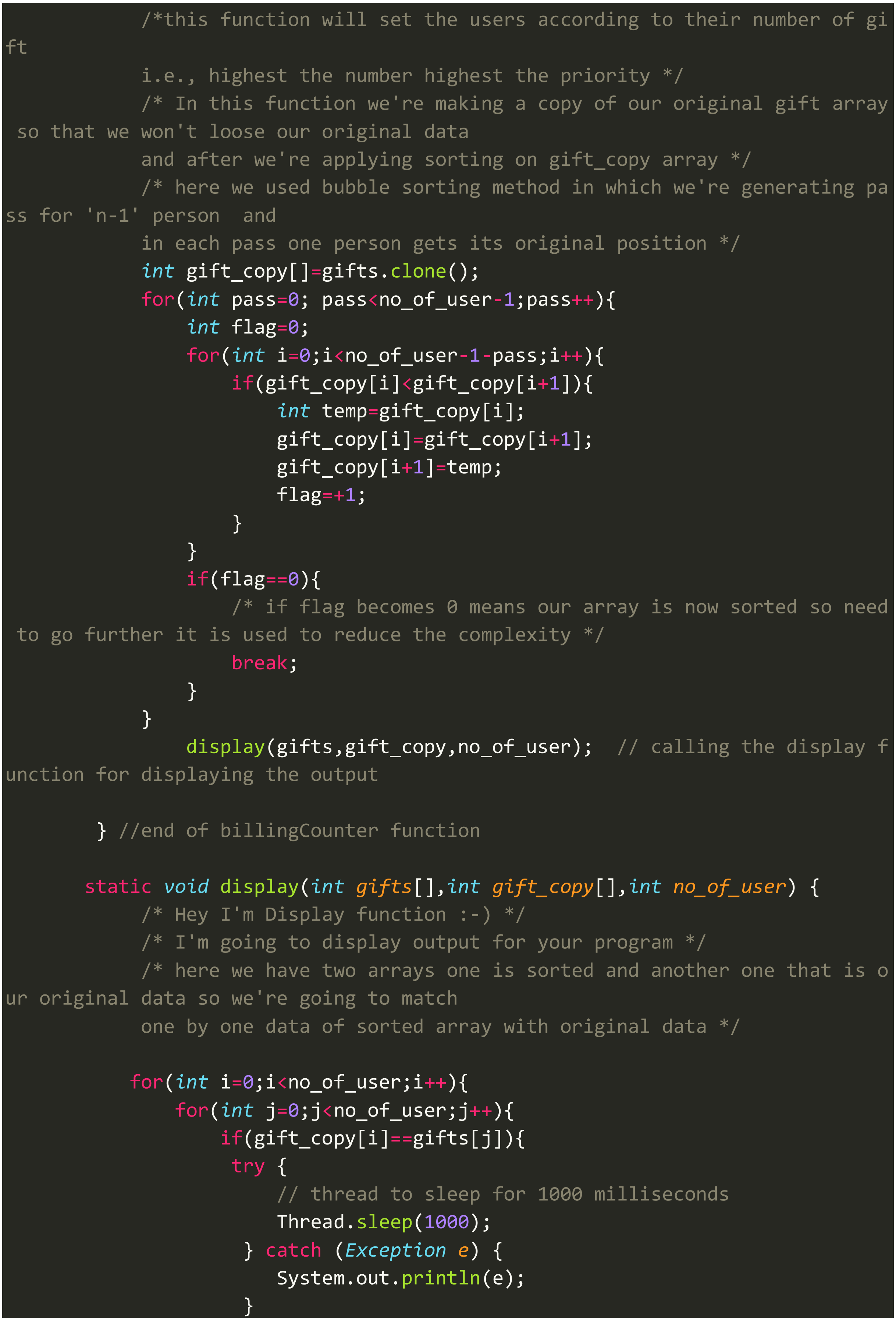
GitHub Link: https://github.com/ritikkr/OSPROJECT

Code of Question No 18:

```
import java.util.Scanner;  //Scanner class is use for taking user input
import java.util.Random; //Random class is use to produce random number betwee
n given range
class OSPROJECT{
        public static void main(String args[]){
            /* Hey its me Main function, Your program is nothing without me */

            //this is main function which is intially load by JVM automaticall
y

        Scanner input=new Scanner(System.in);  //Scanner object refernce
        System.out.print("Enter No of user: ");
        int no_of_user=input.nextInt();   //this variable will store no of use
r
            giftShop(no_of_user);  //calling giftShop function


        }
        static void giftShop(int no_of_user){
            /* Hello there I'm giftShop function :-) */

            //I'm going to generate random number of gifts for given number of
 users

            Random rand=new Random();             //Random class object refern
ce

            int gifts[]=new int[no_of_user]; // Integer array to store no of g
ifts

            for(int i=0;i<no_of_user;i++){
                gifts[i]=rand.nextInt(50); //this will generate random no of g
ift between 0 to 50
            }
             billingCounter(gifts,no_of_user);  //calling billingCounter
        }
        static void billingCounter(int gifts[],int no_of_user){
            /* Hey I'm billingCounter function :-) */
```



```
            /*this function will set the users according to their number of gift
            i.e., highest the number highest the priority */
            /* In this function we're making a copy of our original gift array so that we won't loose our original data
            and after we're applying sorting on gift_copy array */
            /* here we used bubble sorting method in which we're generating pass for 'n-1' person  and
            in each pass one person gets its original position */
            int gift_copy[]=gifts.clone();
            for(int pass=0; pass<no_of_user-1;pass++){
                int flag=0;
                for(int i=0;i<no_of_user-1-pass;i++){
                    if(gift_copy[i]<gift_copy[i+1]){
                        int temp=gift_copy[i];
                        gift_copy[i]=gift_copy[i+1];
                        gift_copy[i+1]=temp;
                        flag=+1;
                    }
                }
                if(flag==0){
                    /* if flag becomes 0 means our array is now sorted so need to go further it is used to reduce the complexity */
                    break;
                }
            }
                display(gifts,gift_copy,no_of_user);  // calling the display function for displaying the output

        } //end of billingCounter function

       static void display(int gifts[],int gift_copy[],int no_of_user) {
            /* Hey I'm Display function :-) */
            /* I'm going to display output for your program */
            /* here we have two arrays one is sorted and another one that is our original data so we're going to match
            one by one data of sorted array with original data */

           for(int i=0;i<no_of_user;i++){
               for(int j=0;j<no_of_user;j++){
                   if(gift_copy[i]==gifts[j]){
                    try {
                        // thread to sleep for 1000 milliseconds
                        Thread.sleep(1000);
                     } catch (Exception e) {
                        System.out.println(e);
                     }
```

```
                       System.out.println((j+1)+" person have "+(i+1)+" priori
ty with gift no: "+gifts[j]+" \n");
                       break;
                   }
               }  //end of j
           } //end of i

        System.out.println("------------------------------------------");
        System.out.println("\tExecution Completed ");
        System.out.println("------------------------------------------");
       }//end of display function
}
```

Questions:

Question 1: Explain the problem in terms of operating system concept? (Max 200 word)

Answer: This algorithm can be use in priority based scheduling algorithm where each process are assigned with some priority. Priority scheduling is a method of scheduling processes based on priority. In this method, the scheduler chooses the tasks to work as per the priority, which is different from other types of scheduling, for example, a simple round robin.

Priority scheduling involves priority assignment to every process, and processes with higher priorities are carried out first, whereas tasks with equal priorities are carried out on a first-come-first-served (FCFS) or round robin basis. An example of a general-priority-scheduling algorithm is the shortest-job-first (SJF) algorithm.

Question 2: Write the algorithm for proposed solution of the assigned problem.

Answer:

```
=> giftshop(no_of_user)
        1. Initialize gifts[no_of_user];
        2. Repeat While i<no_of_user
                2.1 Assigned gift[i] with random number
        3.Exit
=>billingCounter(gifts,no_of_user)
        1.Intialise pass=0, i=0
        2.Copy gifts Array into gift_copy array
        3. Repeat while pass<no_of_user-1
                3.1 Intialise flag=0
                3.2 Repeat while i<no_of_user-1-pass
                        3.2.1 check if gift_copy[i] < gift_copy[i+1] then swap gifts[i] with
gifts[i+1]
```

```
        3.2.2 flag=flag+1
    3.3 chech if flag=0 then break
4.Exit
```

=>Display(int gifts[],int gift_copy[],int no_of_user)

```
1.Initilize i=0 and j=0
2.  Repeat while i<no_of_user
    2.1 Repeat while j<no_of_user
        2.1.1 check if (gift_copy[i]=gifts[j]) then
            Print details of person and sleep for some seconds
        2.1.2 break
3. Print "Execution Completed"
4.Exit
```

Question 3: Calculate complexity of implemented algorithm. (Student must specify complexity of each line of code with overall complexity)

Answer:

The Main Function have complexity of O(1) time.

The Function giftshop has complexity of O(N) where N is no of user

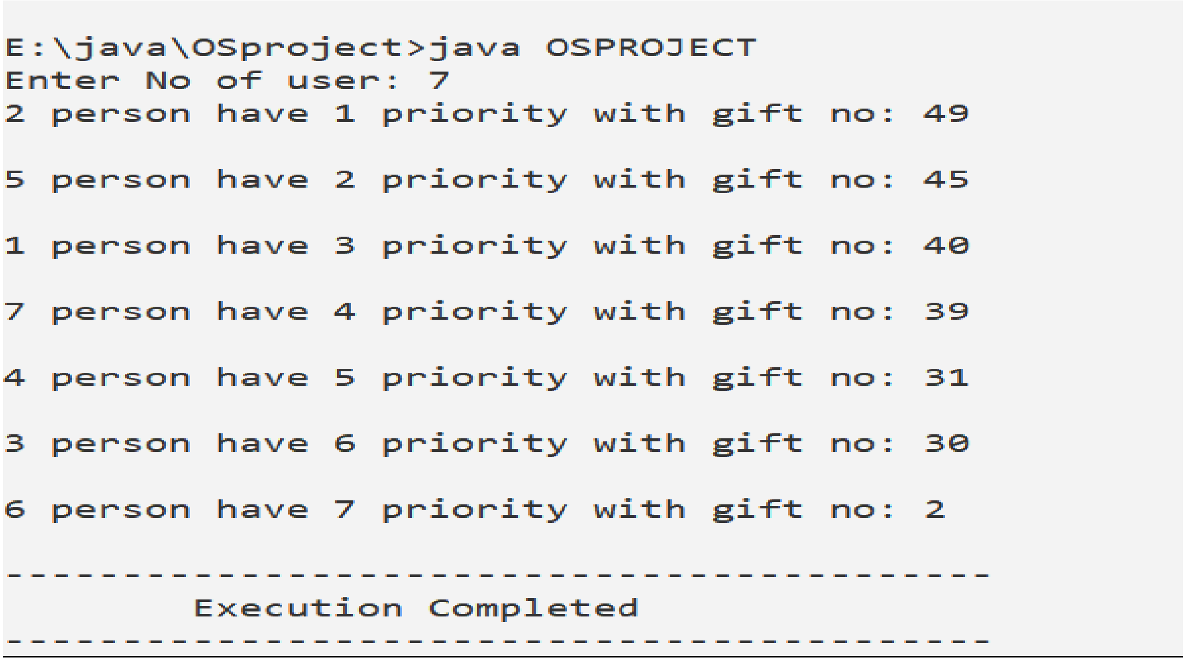
The Function billingCounter has complexity of O(N^2) where again N is no of user

The Function Display have complexity of O(N^2) where N is no of user

Question 4: Explain all the constraint given in the problem. Attach the code snippet pf the implemented constraint.

Answer: As given problem is totally depend upon no of users so only constraint yhat canbe there is no of users should not be more than 32,767

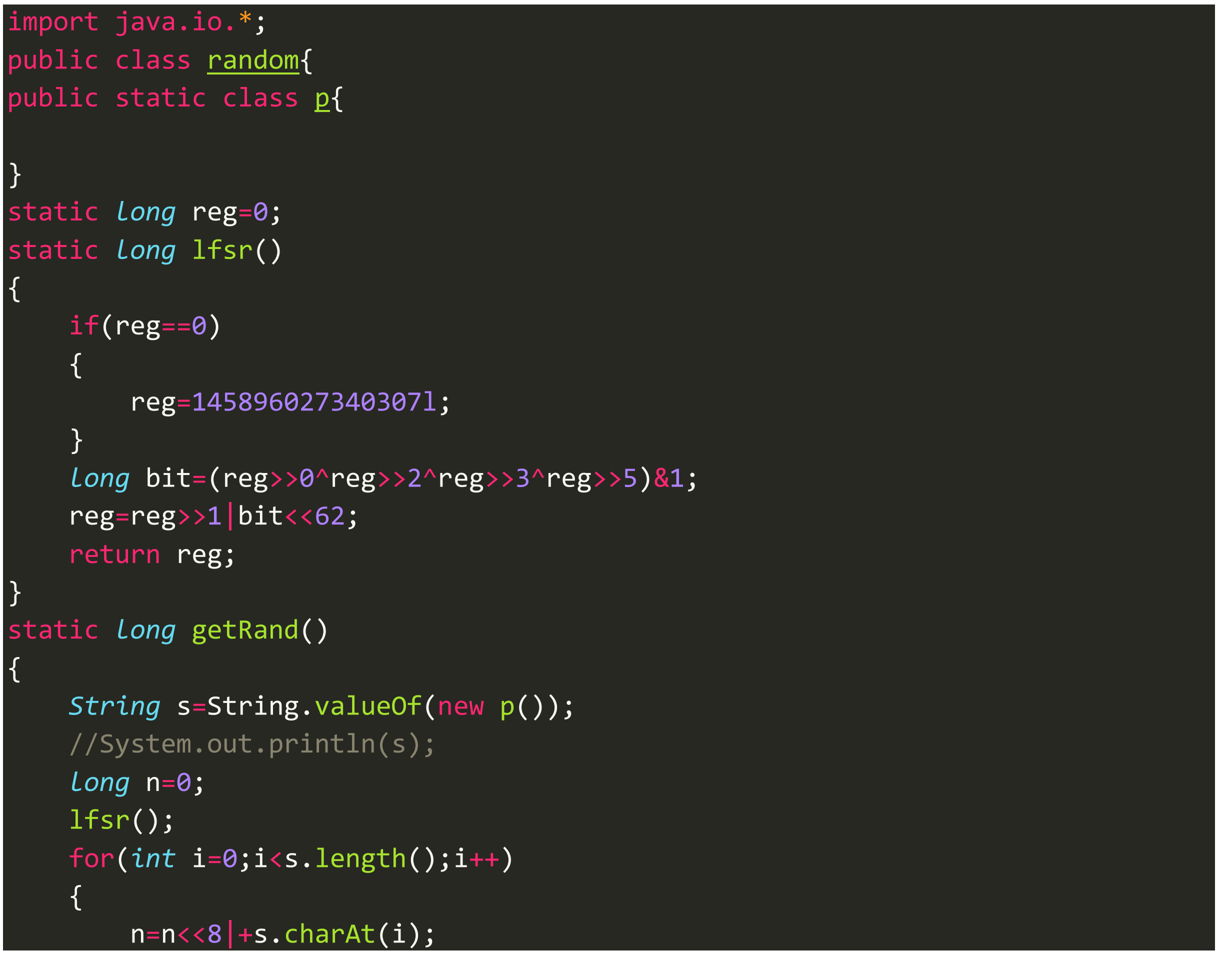
Code Snippet:



```
E:\java\OSproject>java OSPROJECT
Enter No of user: 7
2 person have 1 priority with gift no: 49

5 person have 2 priority with gift no: 45

1 person have 3 priority with gift no: 40

7 person have 4 priority with gift no: 39

4 person have 5 priority with gift no: 31

3 person have 6 priority with gift no: 30

6 person have 7 priority with gift no: 2

-----------------------------------------
        Execution Completed
-----------------------------------------
```

Question 5: If you have implemented any additional algorithm to support the solution explain the need and usage of the same.

Answer: Yes I have implemented a One algorithm that is



```
import java.io.*;
public class random{
public static class p{

}
static long reg=0;
static long lfsr()
{
    if(reg==0)
    {
        reg=145896027340307l;
    }
    long bit=(reg>>0^reg>>2^reg>>3^reg>>5)&1;
    reg=reg>>1|bit<<62;
    return reg;
}
static long getRand()
{
    String s=String.valueOf(new p());
    //System.out.println(s);
    long n=0;
    lfsr();
    for(int i=0;i<s.length();i++)
    {
        n=n<<8|+s.charAt(i);
    }
    System.out.print(n+" "+System.currentTimeMillis()+" "+reg+" ");
    n=n^System.currentTimeMillis()^reg;
    return n;
}
public static void main(String args[])throws IOException
{
    for(int i=0;i<400;i++)
    {
        System.out.println(getRand());
    }
}
```

This is a random number generator where it is guaranteed that the sequence never repeats itself. I have paired time with object value (randomly put by java) with LFSR.

Advantages:

- The sequence doesn't repeat itself
- The sequence is new on every run

Disadvantages:

- Only compatible with java. In C++, new object that is created is same on every run.
- But there too time and LFSR parameters would put in enough randomness
- It is slower than most PRNGs as an object needs to be created everytime a number is needed

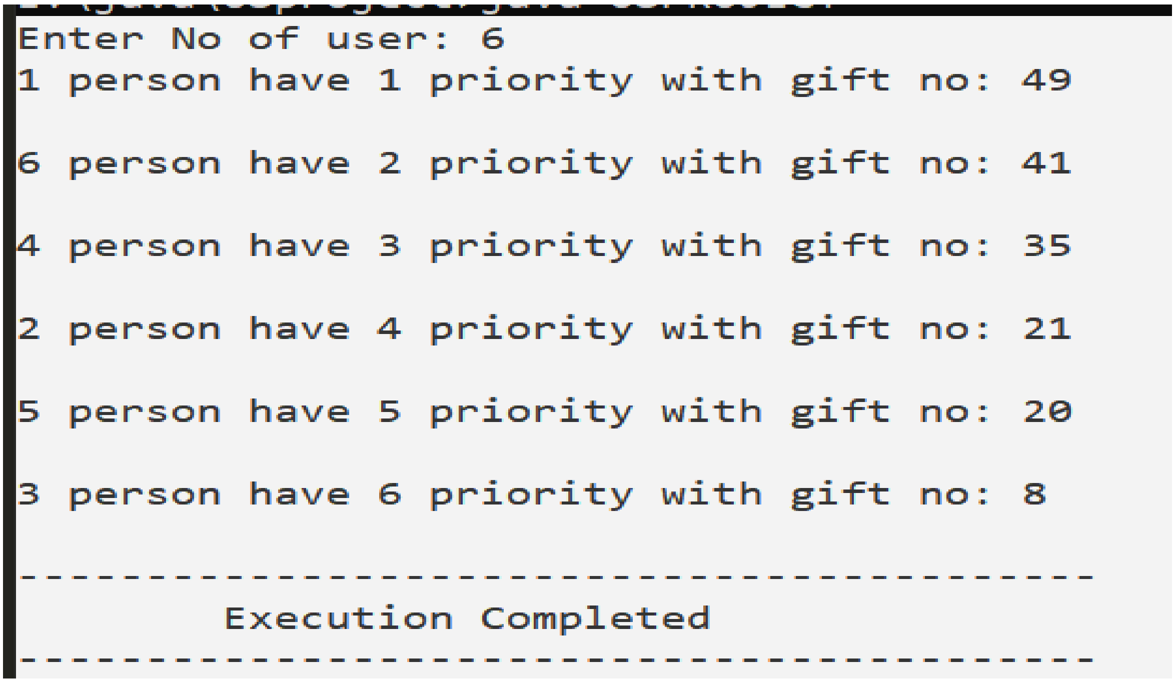
Question 6: Explain the boundary condition of the implemented code.

Answer: All the Variables can store values between 32,767, but I have prohibited using negative values as no of user can’t be negative. So the values can range from 0 to 32,767.

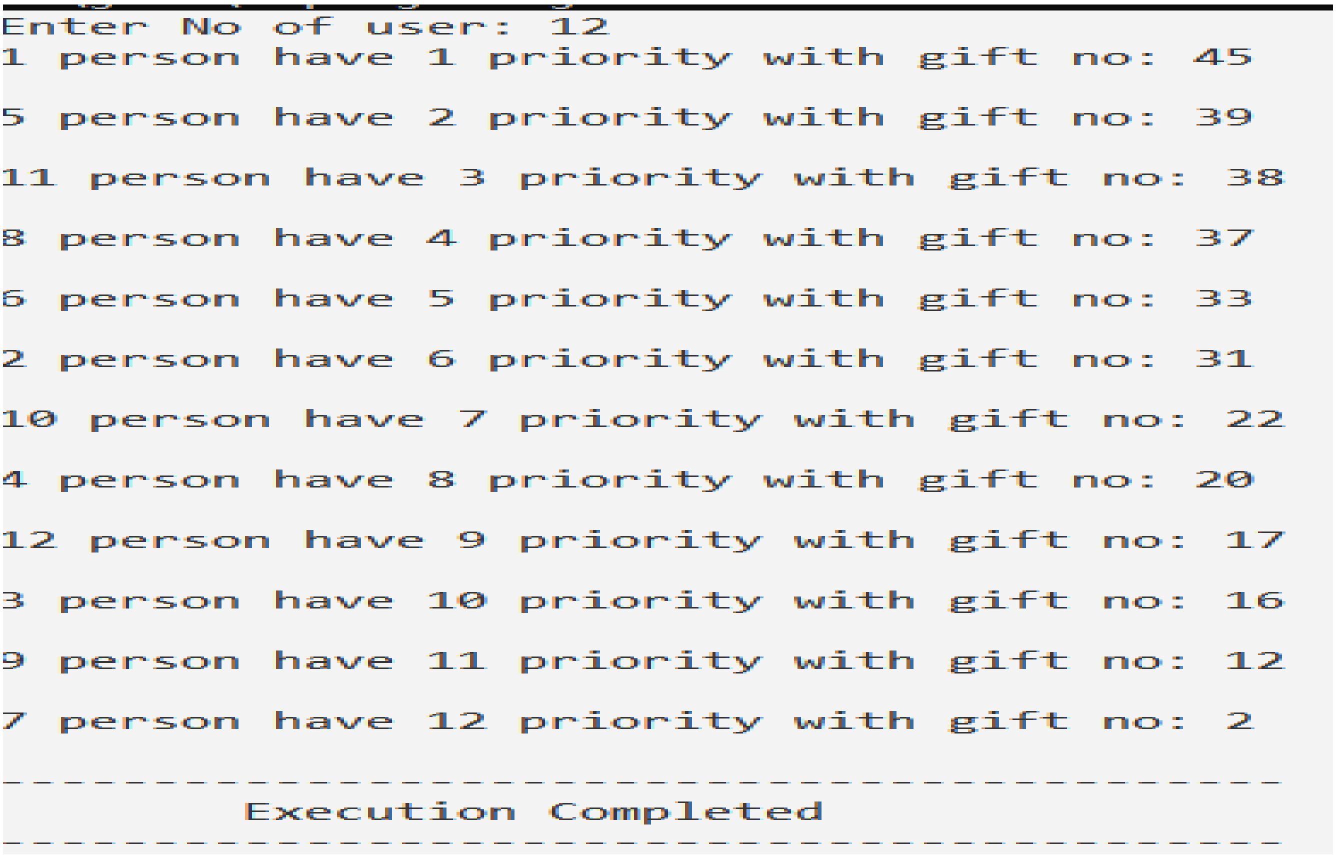
Question 7: Explain all the test cases applied on the solution of assigned problem.

Answer:

Input: No of users: 6



```
Enter No of user: 6
1 person have 1 priority with gift no: 49

6 person have 2 priority with gift no: 41

4 person have 3 priority with gift no: 35

2 person have 4 priority with gift no: 21

5 person have 5 priority with gift no: 20

3 person have 6 priority with gift no: 8

------------------------------------------
        Execution Completed
------------------------------------------
```



```
Enter No of user: 12
1 person have 1 priority with gift no: 45

5 person have 2 priority with gift no: 39

11 person have 3 priority with gift no: 38

8 person have 4 priority with gift no: 37

6 person have 5 priority with gift no: 33

2 person have 6 priority with gift no: 31

10 person have 7 priority with gift no: 22

4 person have 8 priority with gift no: 20

12 person have 9 priority with gift no: 17

3 person have 10 priority with gift no: 16

9 person have 11 priority with gift no: 12

7 person have 12 priority with gift no: 2

------------------------------------------
        Execution Completed
------------------------------------------
```

Question 8: Have you made minimum 5 revision of solution on GitHub?

Answer: Yes.

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