

# DIGITAL HEALTHCARE



*smart*  
Queuing  
Management  
System  
**(S.Q.M.S.)**

**GUIDED BY**

Prof. Shabana Mehfuz

**PRESENTED BY**

Fakhra Najm

Asma Khan

Ayush Chaurasia

Mayank Dutta

# DOCTORS



and their  
Inefficient **Algorithms**

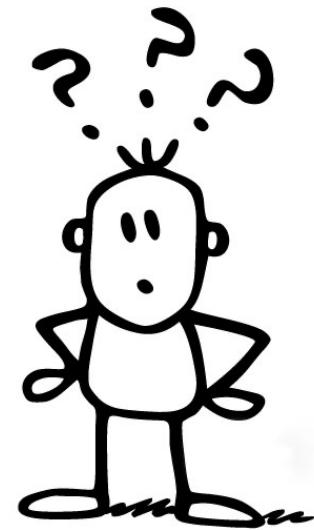
# Overview

- Current system.



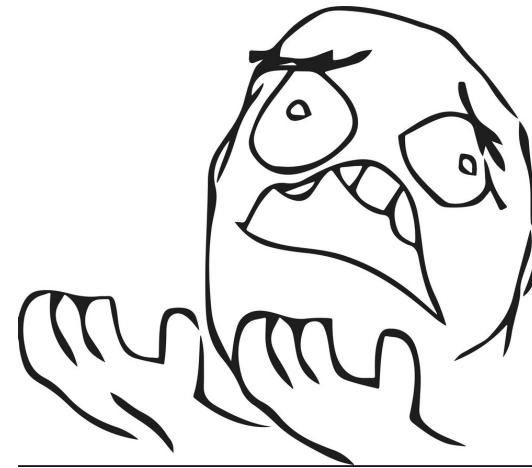
# Overview

- Current system.
- **What Problems.**



# Overview

- Current system.
- What Problems.
- **Why problems.**



# Overview

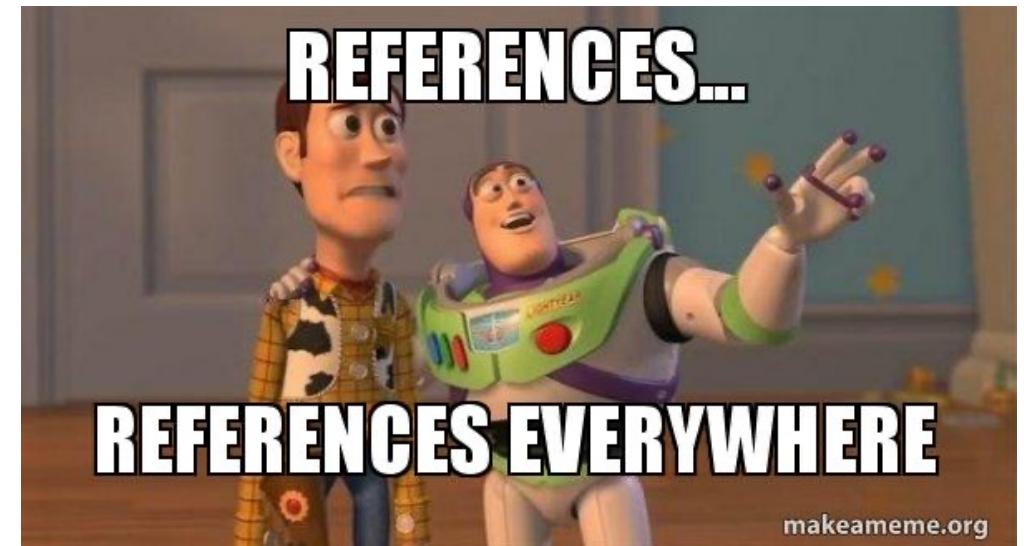
- Current system.
- What Problems.
- Why problems.
- **How to.**



**HOW???**

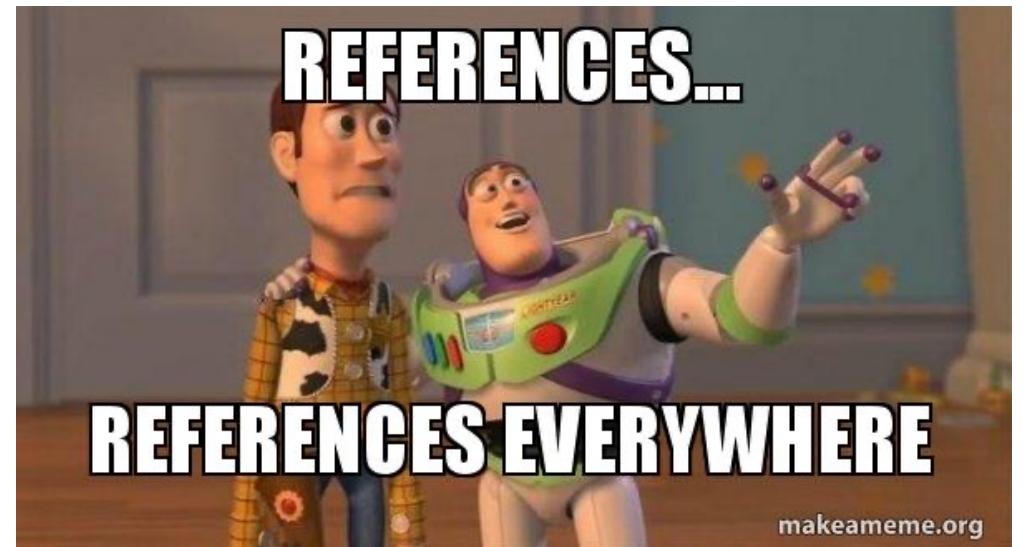
# Overview

- Current system.
- What Problems.
- Why problems.
- How to.
- **Conclusion**



# Overview

- Current system.
- What Problems.
- Why problems.
- How to.
- Conclusion
- **References.**



**First come**

**the APPPOINTMENTS**



**Counter**

Patient 1 | Patient 2 | Patient 3 | Patient 4 | Patient 5 | Patient 6 | Patient 7 | Patient 8

# Appointments begins



Counter

Patient 1

Patient 2

Patient 3

Patient 4

Patient 5

Patient 6

Patient 7

Patient 8

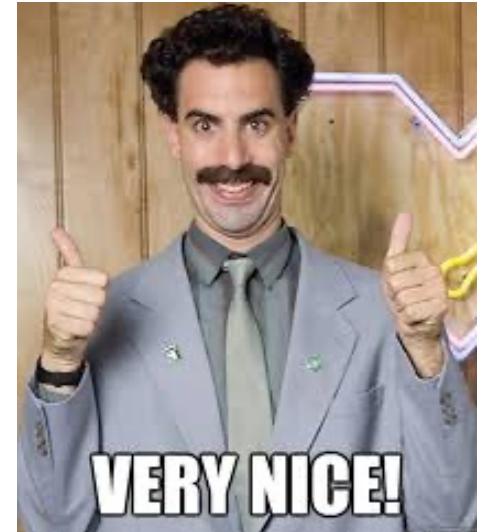


# Appointments begins

Counter	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5	Patient 6	Patient 7	Patient 8
---------	-----------	-----------	-----------	-----------	-----------	-----------	-----------	-----------



# Appointments done



Counter

Patient 1 | Patient 2 | Patient 3 | Patient 4 | Patient 5 | Patient 6 | Patient 7 | Patient 8



On scheduled **day**

CHECK UP **begins**



# Checking patients

Counter

Patient 1 Patient 2 Patient 3 Patient 4 Patient 5 Patient 6 Patient 7 Patient 8



# One absentee

Counter

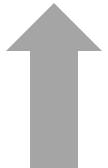
Patient 1 Patient 2 Patient 3 Patient 4 Patient 5 Patient 6 Patient 7 Patient 8



# Checking Patients

Counter

Patient 1 Patient 2 Patient 3 Patient 4 Patient 5 Patient 6 Patient 7 Patient 8



# Patient 2 arrives



Counter

Patient 1

Patient 2

Patient 3

Patient 4

Patient 5

Patient 6

Patient 7

Patient 8



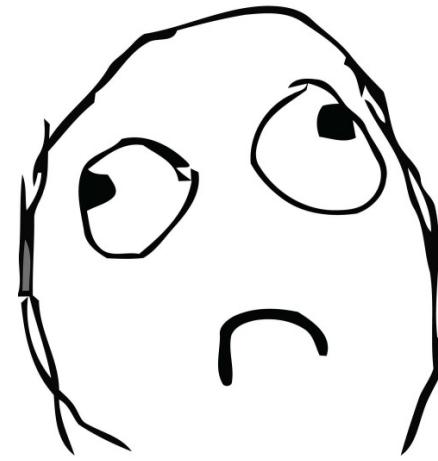
Mayank

Counter

Patient 1 Patient 2 Patient 3 Patient 4 Patient 5 Patient 6 Patient 7 Patient 8



Just **where?**



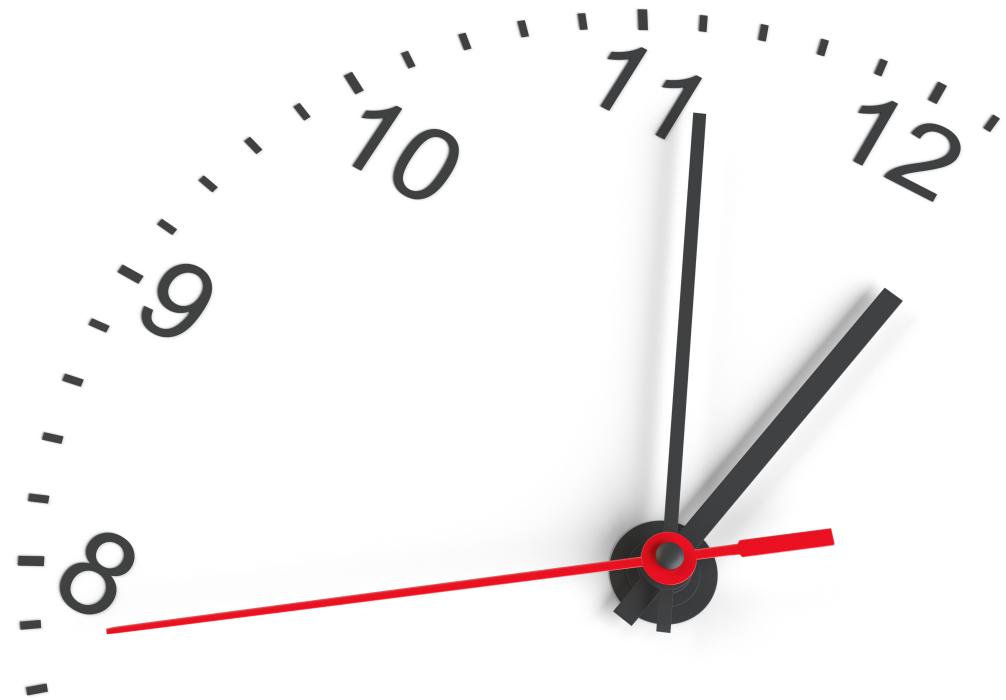
# Just **where**?

Immediately?  
few patients?  
At the end?



# Just **where**?

Immediately?  
**few patients?**  
At the end?



# Just **where?**

Immediately?  
few patients?  
**At the end?**



TWO common ways

# TWO common ways

1. Doctor's helper try to think
2. Doctor's helper try NOT to think

# Patient 2 arrives

Counter

Patient 1

Patient 2

Patient 3

Patient 4

Patient 5

Patient 6

Patient 7

Patient 8



Call  
immediately

# Patient 2 arrives

Counter    Patient 1    Patient 2    Patient 3    Patient 4    Patient 5    Patient 6    Patient 7    Patient 8

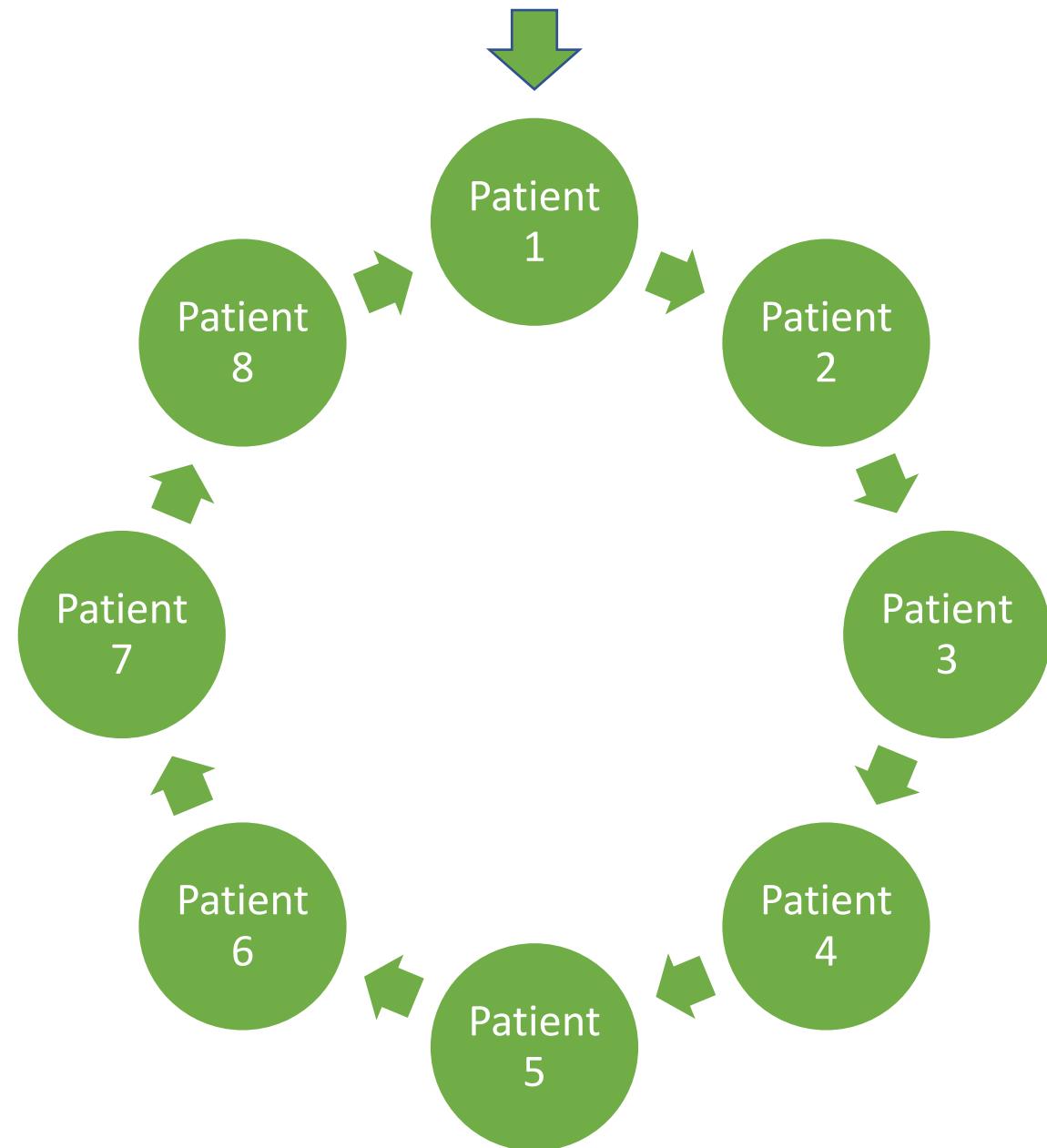


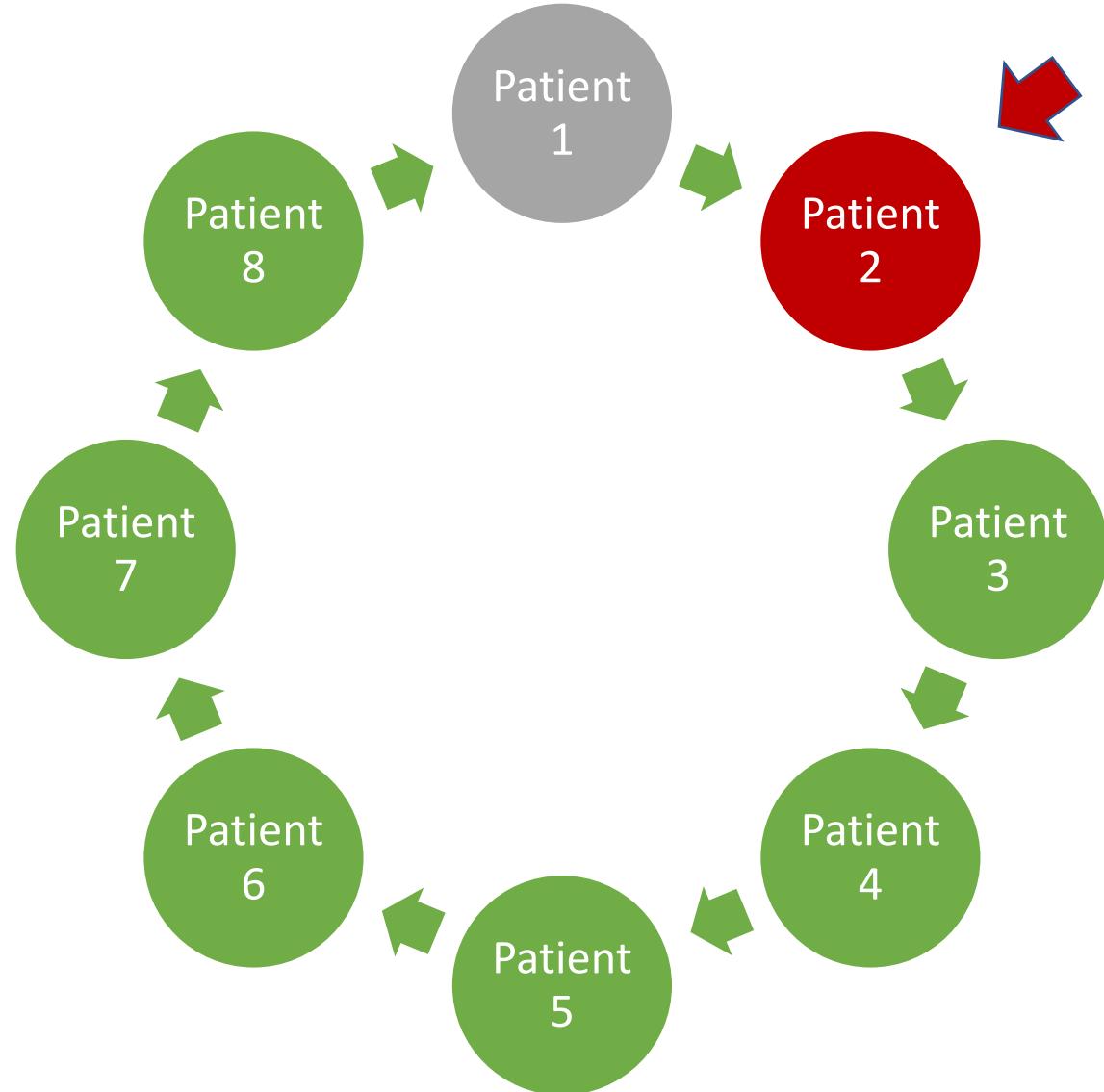
Call after 10  
patients

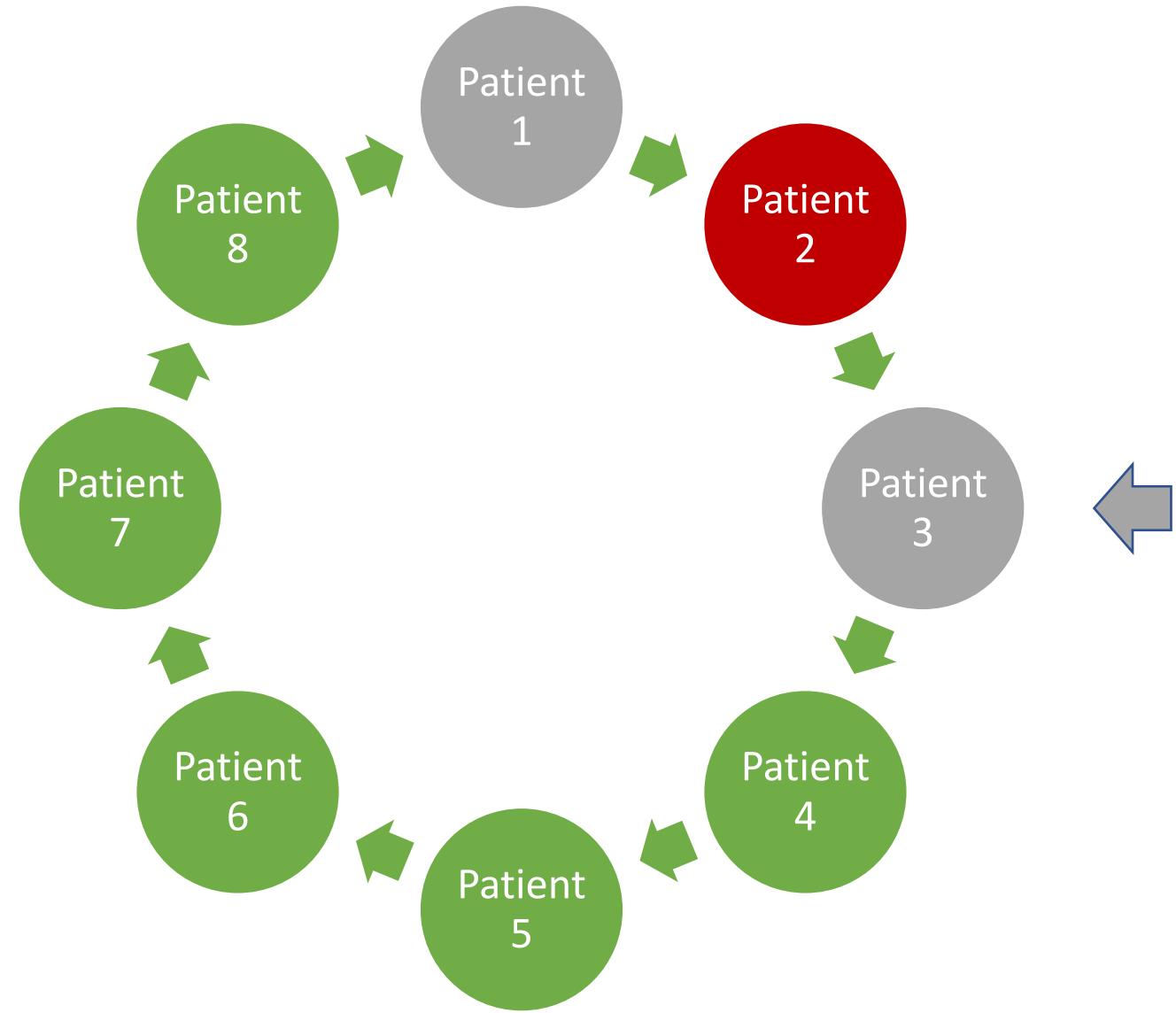
# TWO common ways

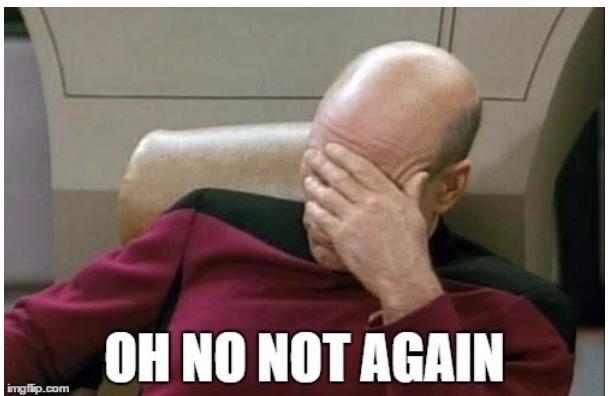
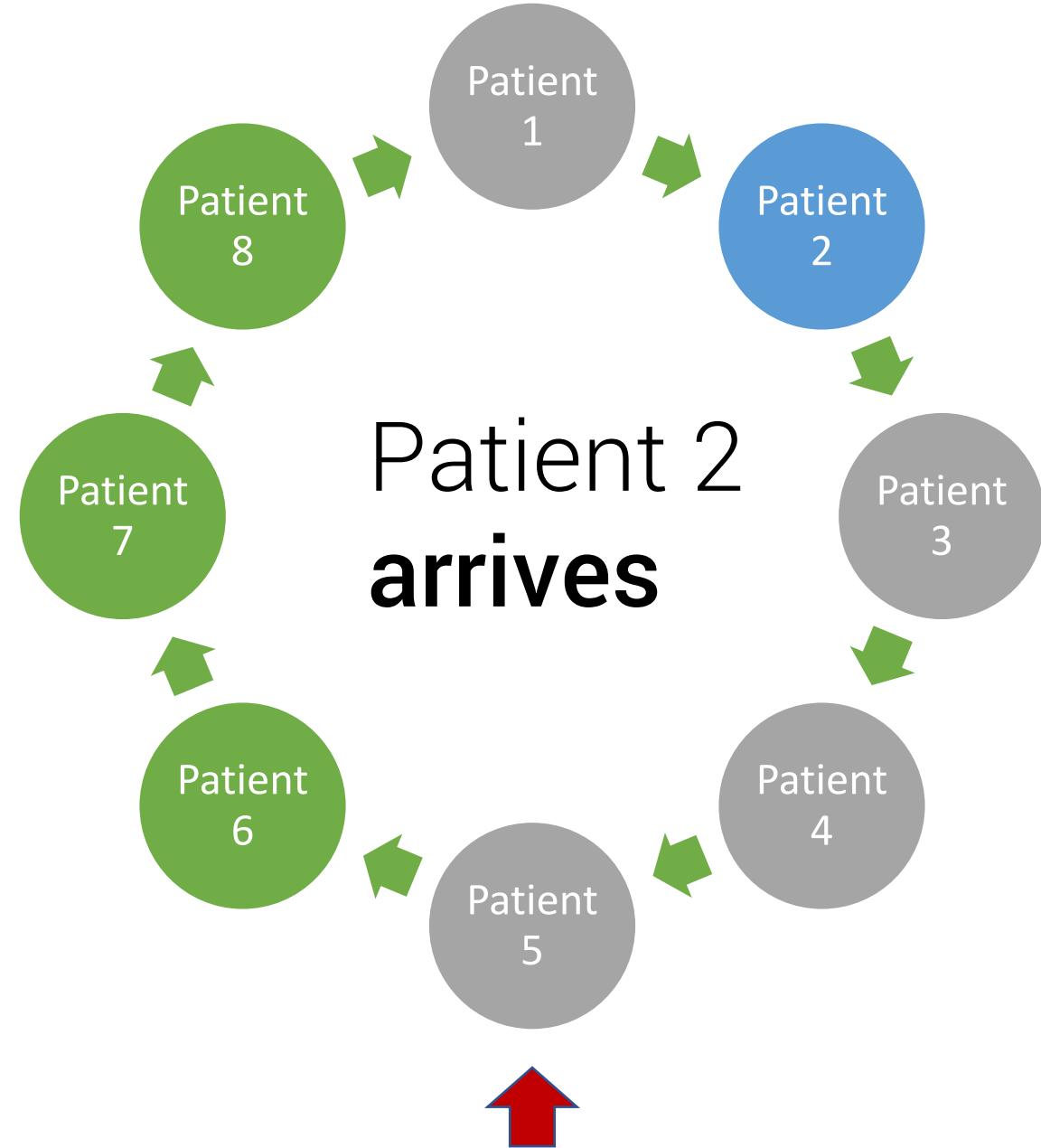
1. Doctor's helper try to think
2. Doctor's helper try NOT to think

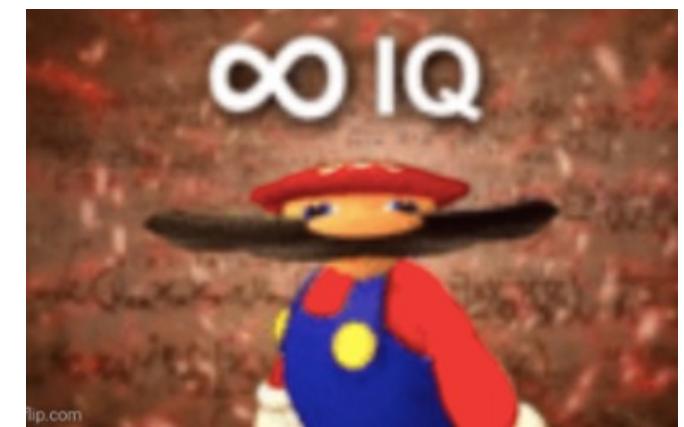
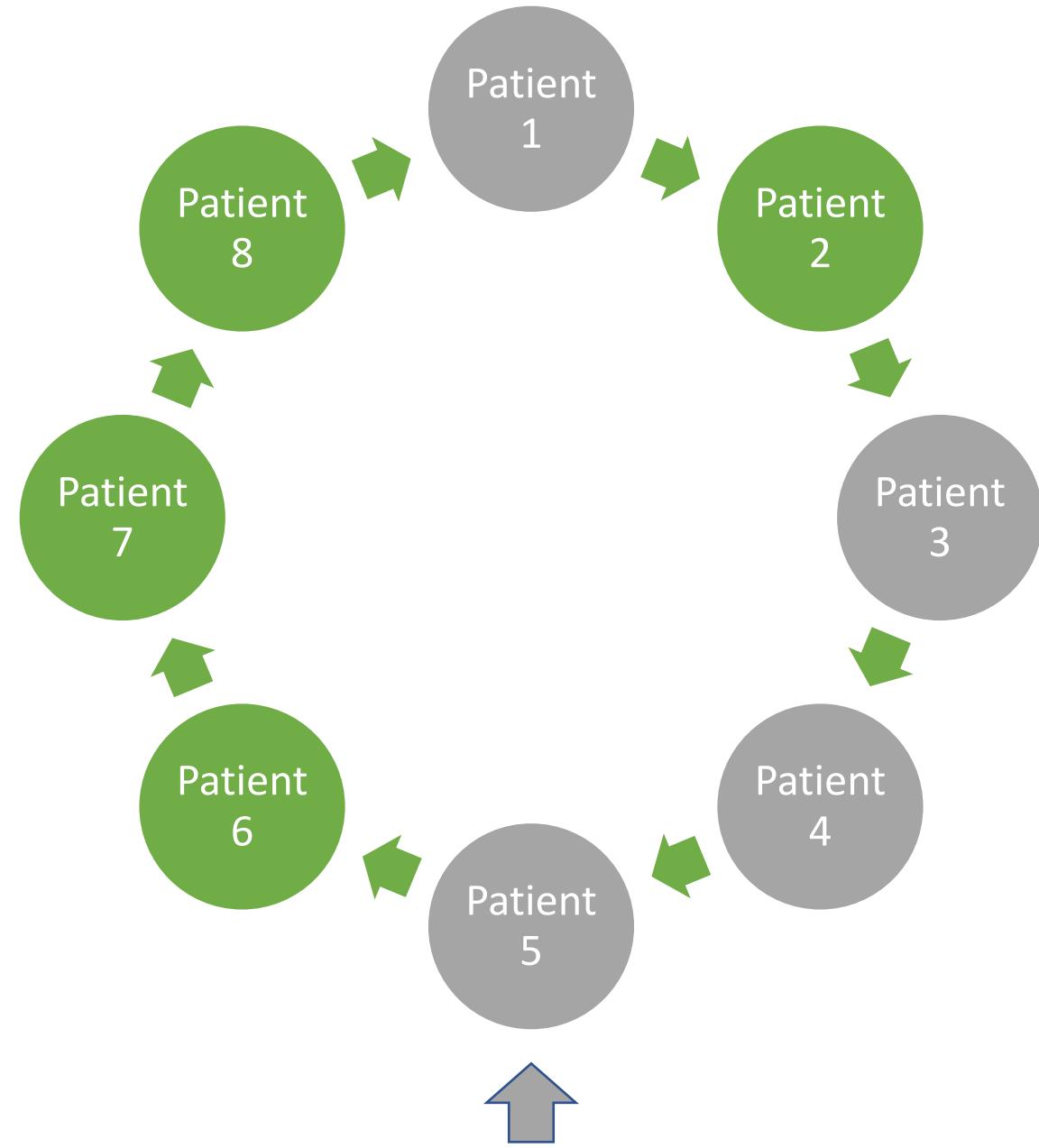
the **CIRCULAR QUEUE** method

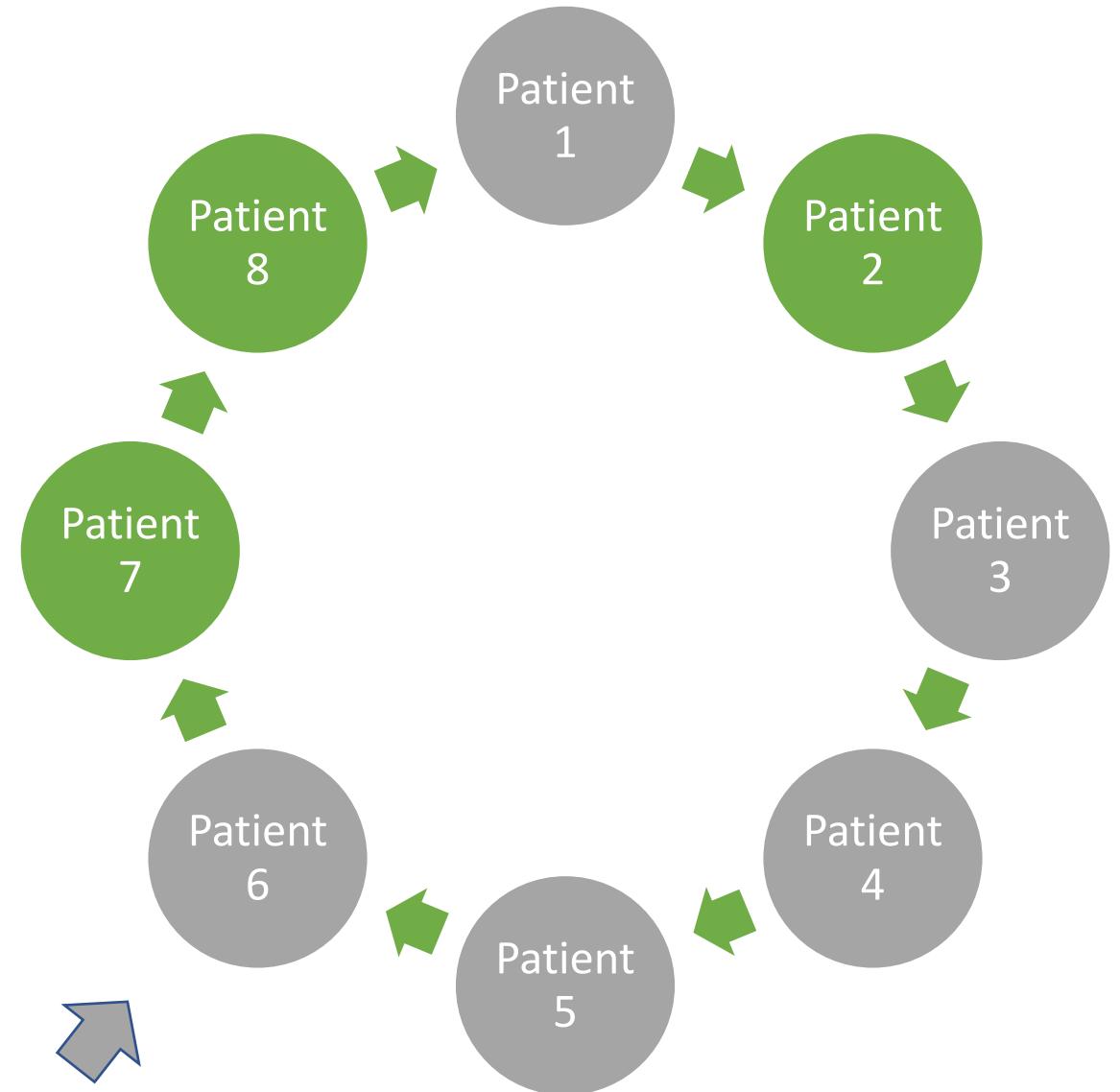


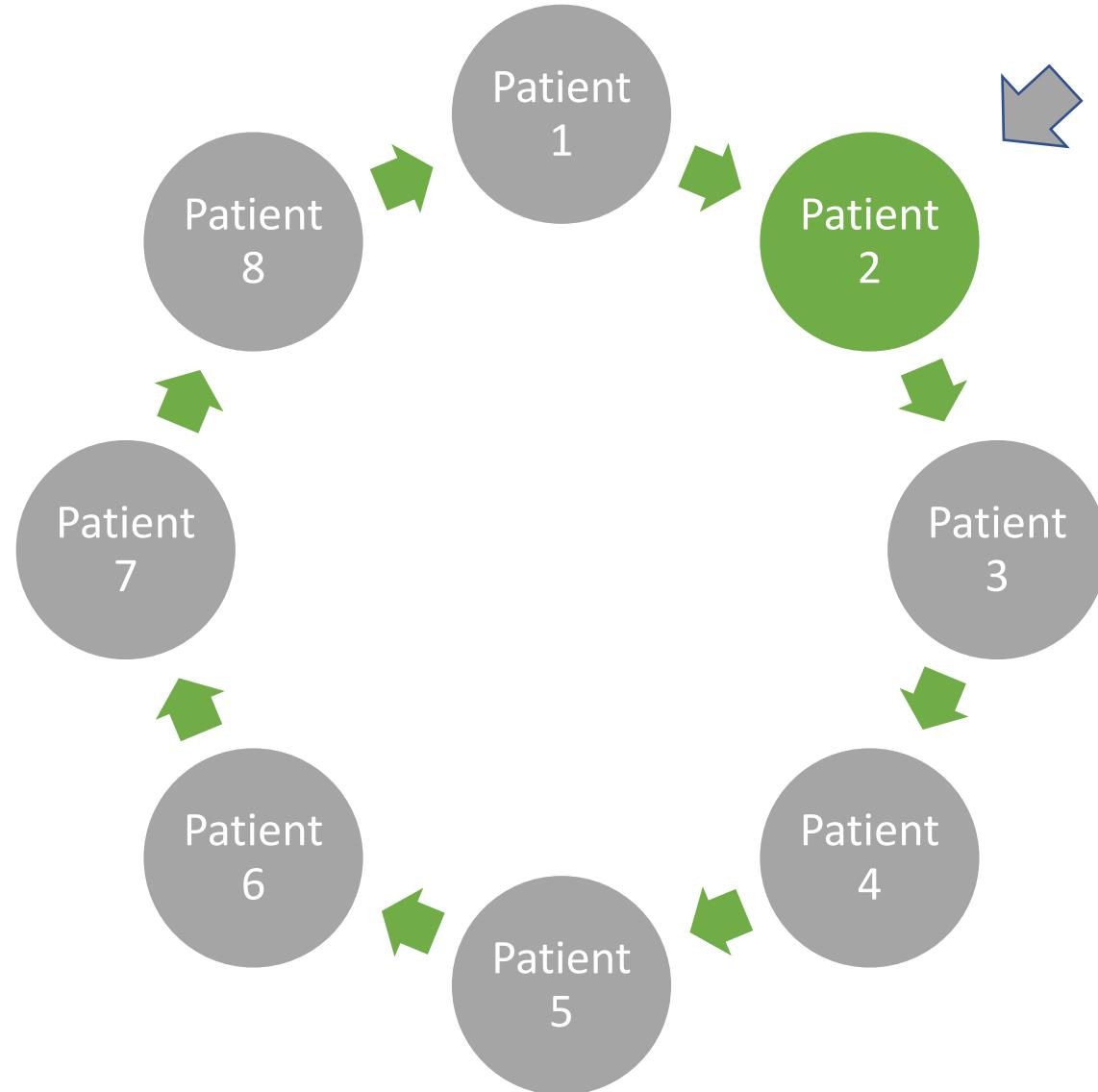












# **THE PROBLEMS**

common in both

We don't realize  
whom to put  
where after the  
first allocation.

---





Not providing  
value to the  
time of  
patients

---



No standard  
system.

---



Fakhra

# THE SOLUTION

HYBRID OF TWO CONVENTIONAL SOLUTIONS

# Parameters **to** Consider

- Value the time who are present in the clinic.
- Placing the latecomers efficiently.
- Value the time of latecomers.



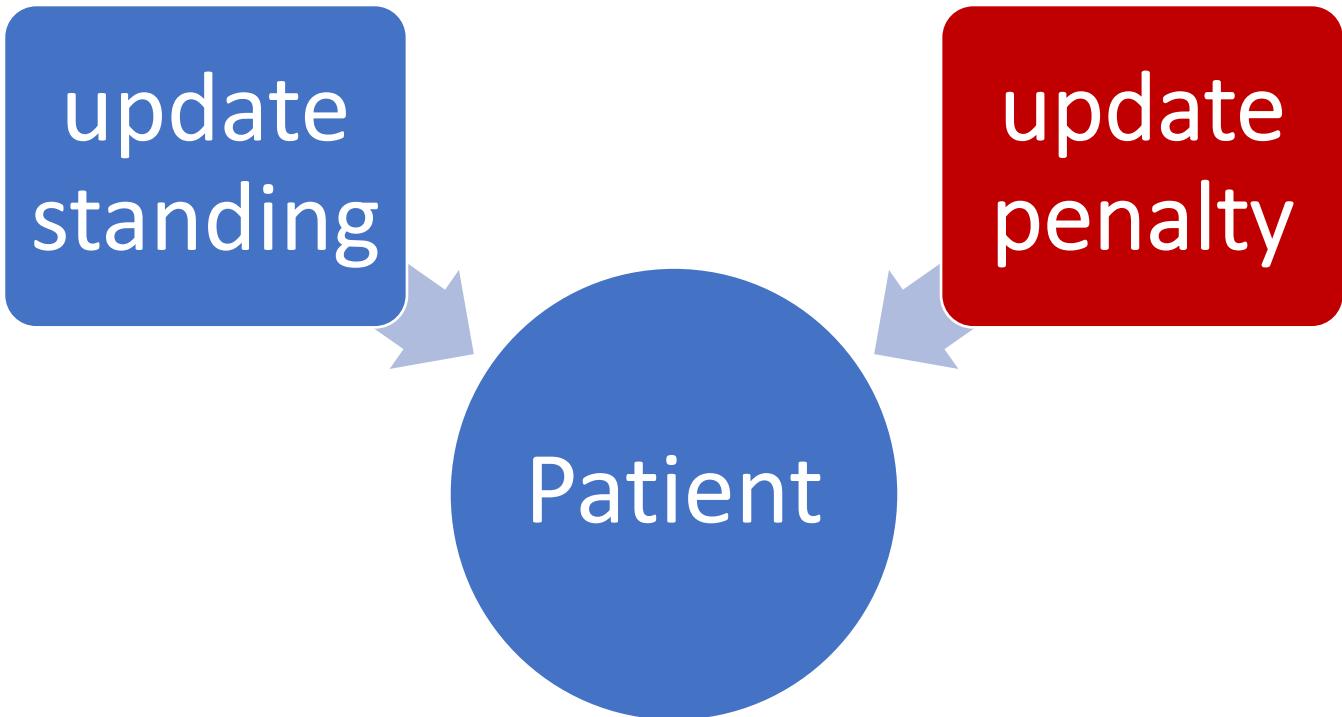
Assign **PRIORITY**  
to each patient  
instead of **RANK**.

---



## Patient

- Name
- Current standing
- Token
- penalty



Counter	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5	Patient 6	Patient 7	Patient 8
Priority	1	2	3	4	5	6	7	8



Counter	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5	Patient 6	Patient 7	Patient 8
Priority	1	2	3	4	5	6	7	8



Counter	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5	Patient 6	Patient 7	Patient 8
---------	-----------	-----------	-----------	-----------	-----------	-----------	-----------	-----------

Priority	1	2	3	4	5	6	7	8
----------	---	---	---	---	---	---	---	---



Counter	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5	Patient 6	Patient 7	Patient 8
---------	-----------	-----------	-----------	-----------	-----------	-----------	-----------	-----------

Priority	1	2	3	4	5	6	7	8
----------	---	---	---	---	---	---	---	---



Counter	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5	Patient 6	Patient 7	Patient 8
Priority	1	2	3	4	5	6	7	8



Counter	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5	Patient 6	Patient 7	Patient 8
Priority	1	2 + penalty	3	4	5	6	7	8



Patient 2 late for the first time

**Penalty = 2**

Counter	Patient 1	Patient 3	Patient 2	Patient 4	Patient 5	Patient 6	Patient 7	Patient 8
Priority	1	2	4	4	5	6	7	8



Counter	Patient 1	Patient 3	Patient 2	Patient 4	Patient 5	Patient 6	Patient 7	Patient 8
---------	-----------	-----------	-----------	-----------	-----------	-----------	-----------	-----------

Priority	1	2	4	4	5	6	7	8
----------	---	---	---	---	---	---	---	---



Counter	Patient 1	Patient 3	Patient 2	Patient 4	Patient 5	Patient 6	Patient 7	Patient 8
Priority	1	2	4	4	5	6	7	8



Counter	Patient 1	Patient 3	Patient 2	Patient 4	Patient 5	Patient 6	Patient 7	Patient 8
Priority	1	2	4 + Penalty	4	5	6	7	8



Patient 2 late for the **SECOND** time  
**Penalty = 3**

Counter	Patient 1	Patient 3	Patient 4	Patient 5	Patient 6	Patient 2	Patient 7	Patient 8
Priority	1	2	4	5	6	7	7	8



Counter	Patient 1	Patient 3	Patient 4	Patient 5	Patient 6	Patient 2	Patient 7	Patient 8
---------	-----------	-----------	-----------	-----------	-----------	-----------	-----------	-----------

Priority	1	2	4	5	6	7	7	8
----------	---	---	---	---	---	---	---	---



Counter	Patient 1	Patient 3	Patient 4	Patient 5	Patient 6	Patient 2	Patient 7	Patient 8
Priority	1	2	4	5	6	7	7	8



Counter	Patient 1	Patient 3	Patient 4	Patient 5	Patient 6	Patient 2	Patient 7	Patient 8
Priority	1	2	4	5	6	7	7	8



what else ...

Take situation of **Pandemic**

Let, **Capacity** of clinic be **8**  
Now, **Reduced** to **3**

*to maintain social distancing*

# Clinic

Counter

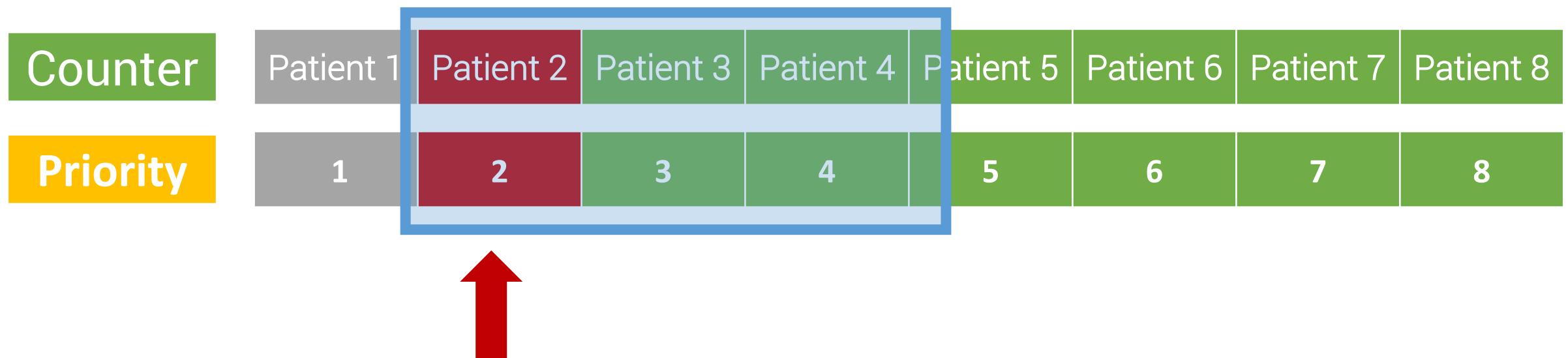
Patient 1 | Patient 2 | Patient 3 | Patient 4 | Patient 5 | Patient 6 | Patient 7 | Patient 8

Priority

1 | 2 | 3 | 4 | 5 | 6 | 7 | 8



# Clinic



# Clinic

Counter	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5	Patient 6	Patient 7	Patient 8
Priority	1	2 + penalty	3	4	5	6	7	8



Patient 2 late for the first time

**Penalty = 2**

# Clinic

Counter	Patient 1	Patient 3	Patient 2	Patient 4	Patient 5	Patient 6	Patient 7	Patient 8
Priority	1	2	4	4	5	6	7	8



# Clinic

Counter

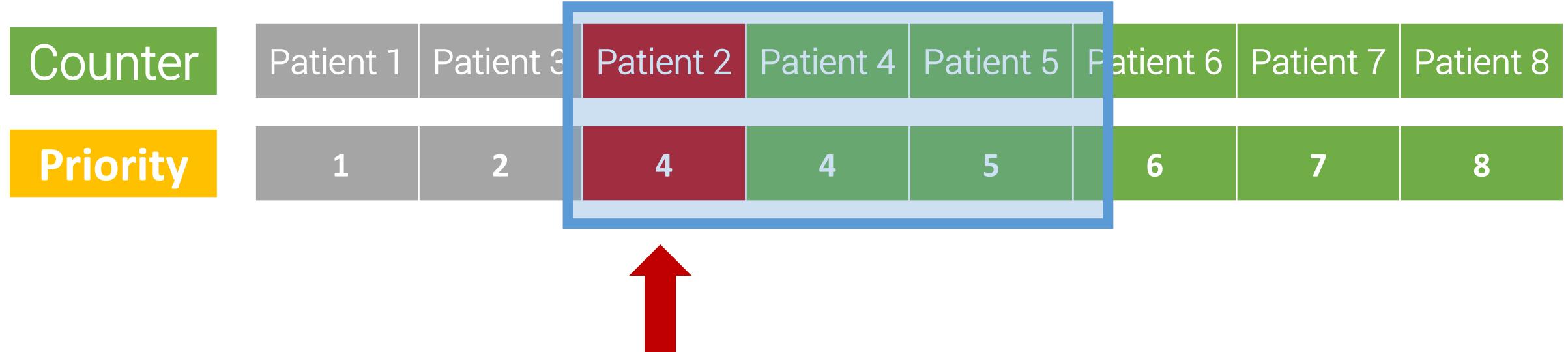
Patient 1 Patient 3 Patient 2 Patient 4 Patient 5 Patient 6 Patient 7 Patient 8

Priority

1 2 4 4 5 6 7 8



# Clinic



# Clinic

Counter	Patient 1	Patient 3	Patient 2	Patient 4	Patient 5	Patient 6	Patient 7	Patient 8
Priority	1	2	4 + penalty	4	5	6	7	8



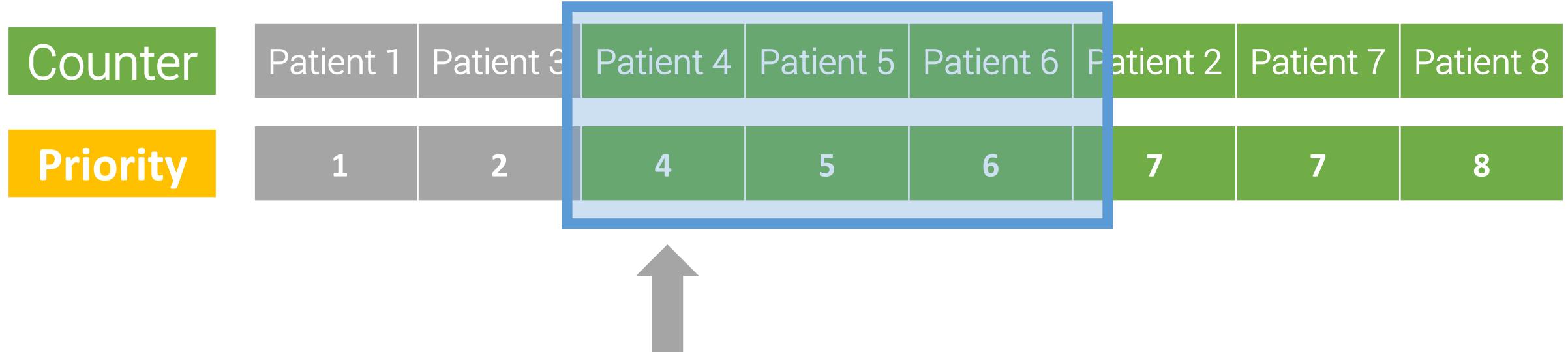
Patient 2 late for the **SECOND** time  
**Penalty = 3**

# Clinic

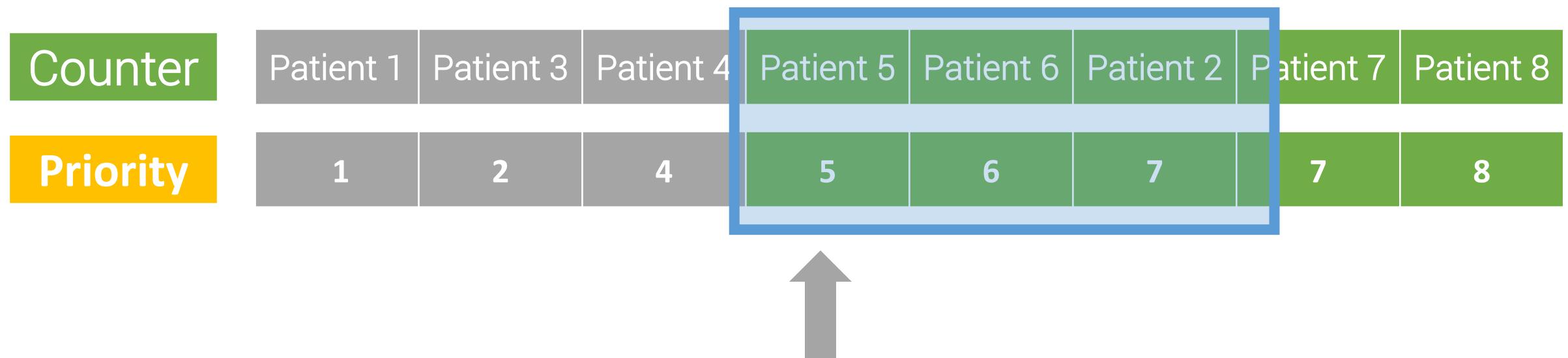
Counter	Patient 1	Patient 3	Patient 4	Patient 5	Patient 6	Patient 2	Patient 7	Patient 8
Priority	1	2	4	5	6	7	7	8



# Clinic



# Clinic



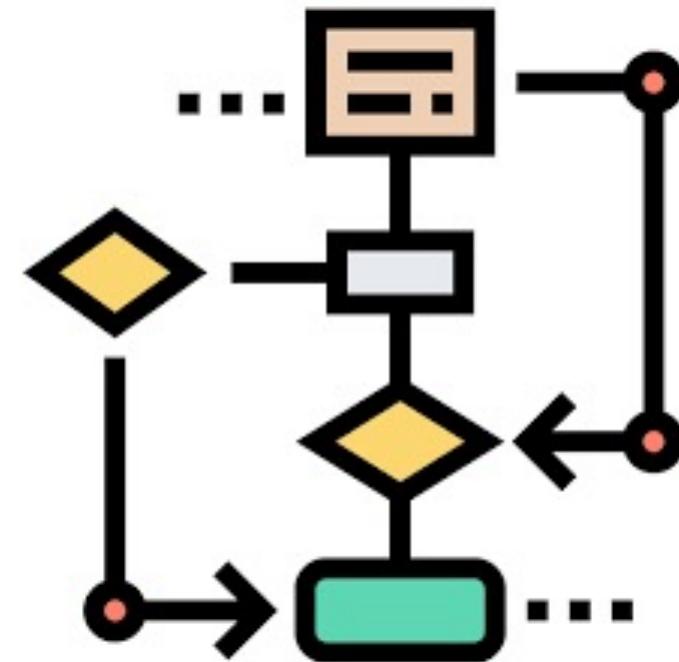
# Clinic

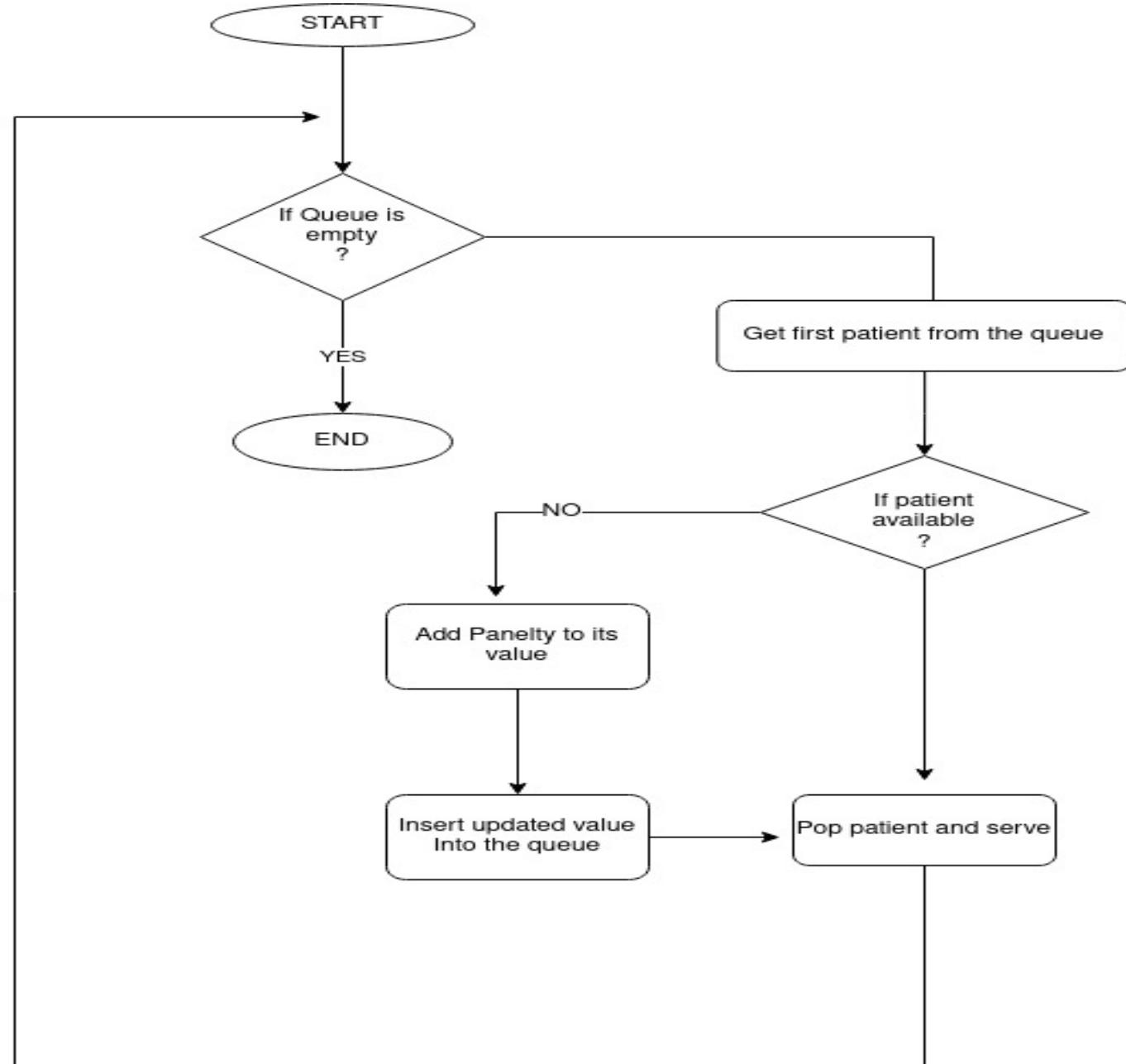
Counter	Patient 1	Patient 3	Patient 4	Patient 5	Patient 6	Patient 2	Patient 7	Patient 8
Value	1	2	4	5	6	7	7	8



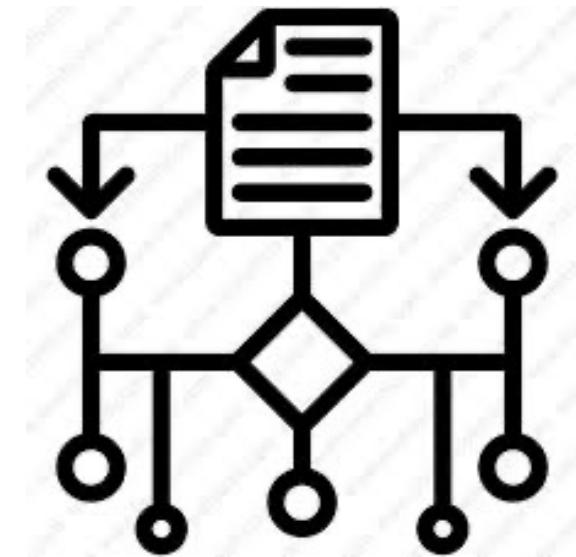
Ayush

# THE FLOW CHART





# THE ALGORITHM



Get total Appointments

Make a queue

Assign priorities // least to first and most to last.

/\* Doctor arrived, initiate the process \*/

Loop: *till queue not become empty*

Pick the first value from the queue

If patient absent:

    Update penalty

    update the standing

Else:

    take him out of the queue, send him to doctor

# Conclusion

1. Implementation of this seminar topic will help assigning the correct priority to each patient.
2. The time of the patients are valued.
3. The needs of the patients, staff and hospital authorities are covered.
4. The interaction inside a queuing system becomes easy and convenient

# References

1. Sumit Soman; Sudeep Rai; Priyesh Ranjan; Amarjeet Singh Cheema; Praveen K Srivastava “ **Mobile-Augmented Smart Queue Management System for Hospitals**”, International Symposium on Computer-Based Medical Systems (CBMS), September 2020
2. Supriya Burungale, Komal Kurane, Sakshe Mhatre, “ **Patient Queue Management System**” ,International Journal of Engineering Science Invention, volume 7, issue 2, February 2018
3. M. Ngorsed and P. Suesaowaluk, “**Hospital service queue management system with wireless approach,**” in Frontier Computing. Springer, 2016,pp. 627–637
4. Prof. D. V. Chandran, Divya Patil, Pooja Galande, AratiGhutukade, “ **Multiple Queue Management With Real Time Tracking For OPD Scheduling In Hospitals**”, International Journal for Research in Engineering Application & Management, Volume 3, isuue 2, April 2017
5. **Zero Queue Maintenance System using Smart Medi Care Application for Covid-19 Pandemic Situation**, Third International Conference on Intelligent Communication Technologies and Virtual Mobile Networks



Thankyou