SHEng
SMART HEALTHCARE ENGINEERING

Co-funded by the
Erasmus+ Programme
of the European Union

Manisa Celal Bayar University Hafsa Sultan Hospital

2024

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- Scope of a Hospital
- Information about some protection implementation and regulations
- Specific Staff in a Hospital: IT Departmant Staff
- Data Protection and Regulation

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Scope Of A Hospital

- Physical Environment
- Medical Equipment
- Staff
- Patient
- Information

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Physical Environment

- Hospitals have a lot of key aspects for physical environments
- Some of them:
  - Layout and Design
  - Safety and Security
  - Technology Integration
  - Maintenance
  - Cleanliness
  - Etc.

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Medical Equipment

1) DIAGNOSTIC EQUIPMENT

2) LIFE-SAVING DEVICES

3) SURGICAL INSTRUMENTS

4)MONITORING DEVICES

5) TREATMENT EQUIPMENT

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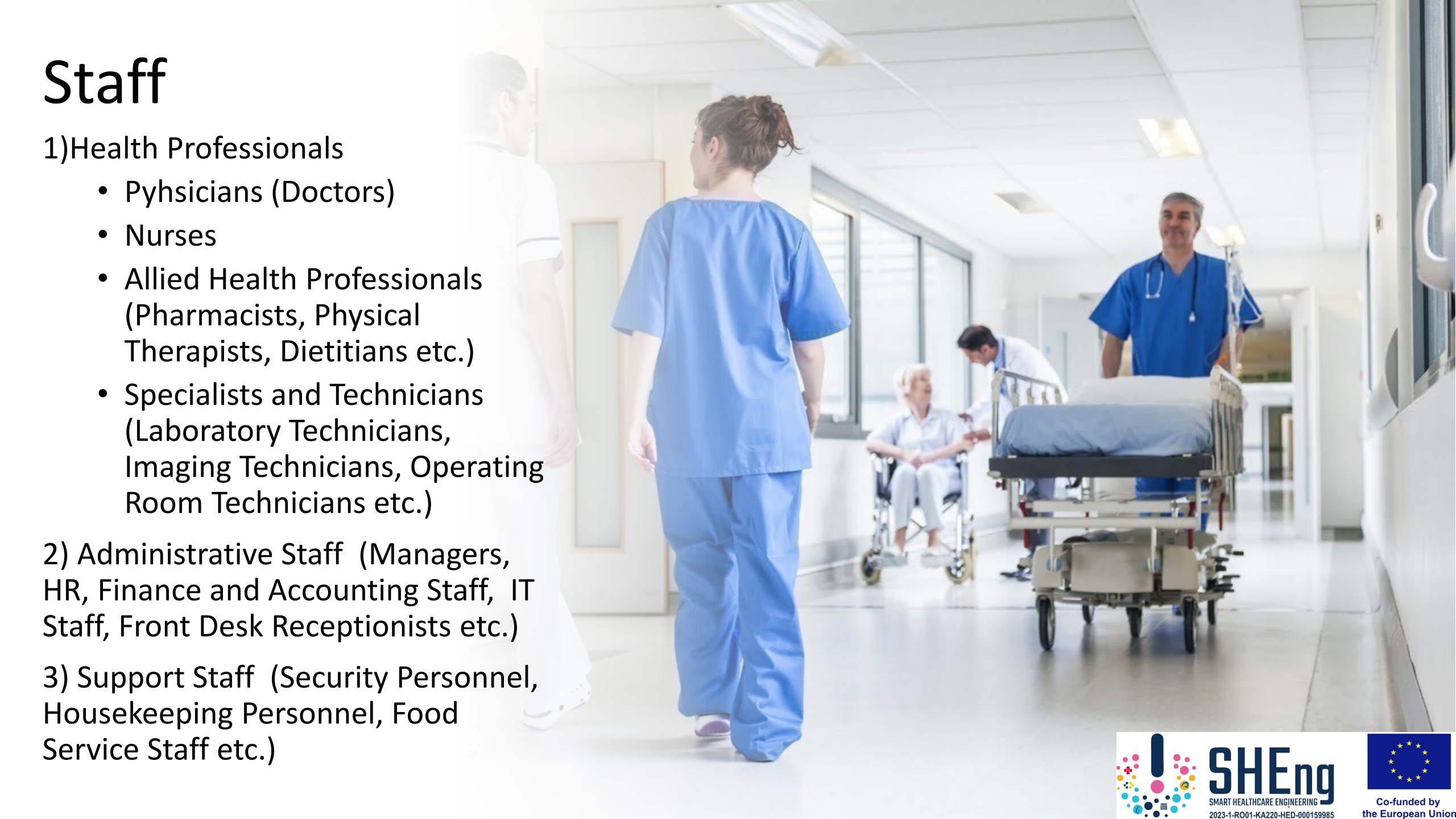
Staff

1)Health Professionals

- Pyhsicians (Doctors)
- Nurses
- Allied Health Professionals (Pharmacists, Physical Therapists, Dietitians etc.)
- Specialists and Technicians (Laboratory Technicians, Imaging Technicians, Operating Room Technicians etc.)

2) Administrative Staff (Managers, HR, Finance and Accounting Staff, IT Staff, Front Desk Receptionists etc.)

3) Support Staff (Security Personnel, Housekeeping Personnel, Food Service Staff etc.)



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Patient

All the time not to forget they are patient

A little empathy is always good

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INFORMATION

- Information is integral to the functioning of hospitals, impacting every aspect from clinical care to administration
- In a hospital we produce, process, save, serve and protect information. And information is everywhere.
- Effective use of information technology and data management in a hospital enhances the quality of care, operational efficiency, and overall patient outcomes.

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Engineers

- A lot of works to do for this scope and subject.
- We are the problem solvers
- No matter what branch of engineering we are from

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Protection

We use many systems and methods to take some precautions to protect elements of hospital scope

- Access control systems,
- License plate recognation,
- Surveillance cameras,
- Emergency response protocols,
- Data security
- Etc.

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Access Control Systems

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Access Control Systems

- To ensure the protection and safety of patients, staff, environment and information together with security personnel we use **ACCESS CONTROL SYSTEMS**

- This system allows authorized people to enter specific zones and restricts entry to unauthorized people.

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Access Control Systems

- Hospitals have many kinds of Staff and Departments
- ACS is used for managing access rights and permissions of department or unit.
- And to log access activities
- Example:
  - Only IT Manager and System Engineer have permission to access Data Center of Hospital

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ACS Components

- Doors with locking hardware (Mechanic Equipment)
- Communication Panels (Between door, reader and software)
- Readers (Card, Biometric, Pin, NFC)
- Software (Check identity and permission)

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Managing ACS (ACS Algorithm)

- Define Doors or zones and can make them group, times for free access
- Define staff role groups and staff
- Authenticate and Authorizate the Request
- Log every request
- Work integrated with emergency warning systems in emergency situations and change the state to free access

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Ways To Get Identity (Technologies)

Mobile Apps (NFC , QR Codes)

NFC Tags

Cards (Proximity, mifare and etc.)

Biometric Readers (Fingerprint, IRIS, Face and etc.)

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Multi Purpose ACS

- Once we set the ACS and ways to get identity, we can use authorization and authentication mechanism for PACS (Personnel Attandance Control System), Meal Delivery System and the others

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License Plate Recognition System

LPRS Components

- Barriers (Mechanic Equipment)
- Magnetic Sensors (For exit)
- Communication Panels (Electronic Circuits) (Between barrier, sensor, camera and software)
- Camera
- Software (Check identity and permission, log the activity)

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Managing LPRS (Algorithm)

- Define parking areas and can make them group,
- Define staff role groups and staff (with theirs vehicle plate info)
- Authenticate and Authorizate the Request
- Log every request

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LPRS (Work Procedure)

TAKE IMAGE (CAPTURE THE VEHICLE)

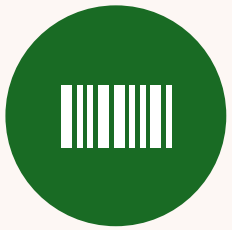

IMAGE PROCESS (LICENCE PLATE DETECTION)

OCR (OPTICAL CHARACTER RECOGNITION)

DATA VERIFICATION

STORE INFORMATION TO DATABASE

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Ways To Get Identity (Technologies)

- Image Processing (licence plate recognation system)
- RFID Labels
- Cards (Proximity, mifare and etc.)

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Specific Staff in a Hospital: IT Department Staff

IT staff in hospitals play a crucial role in ensuring the smooth operation of medical facilities in today's digital age. For that they ensure;

- Infrastructure Management
- Support and Training
- Integration of Medical Devices to systems
- HIS/RIS/LIS Management and Health Records
- Increase Effiency of Health Professionals
- Security
- Comply systems with regulations
- Innovation and Research

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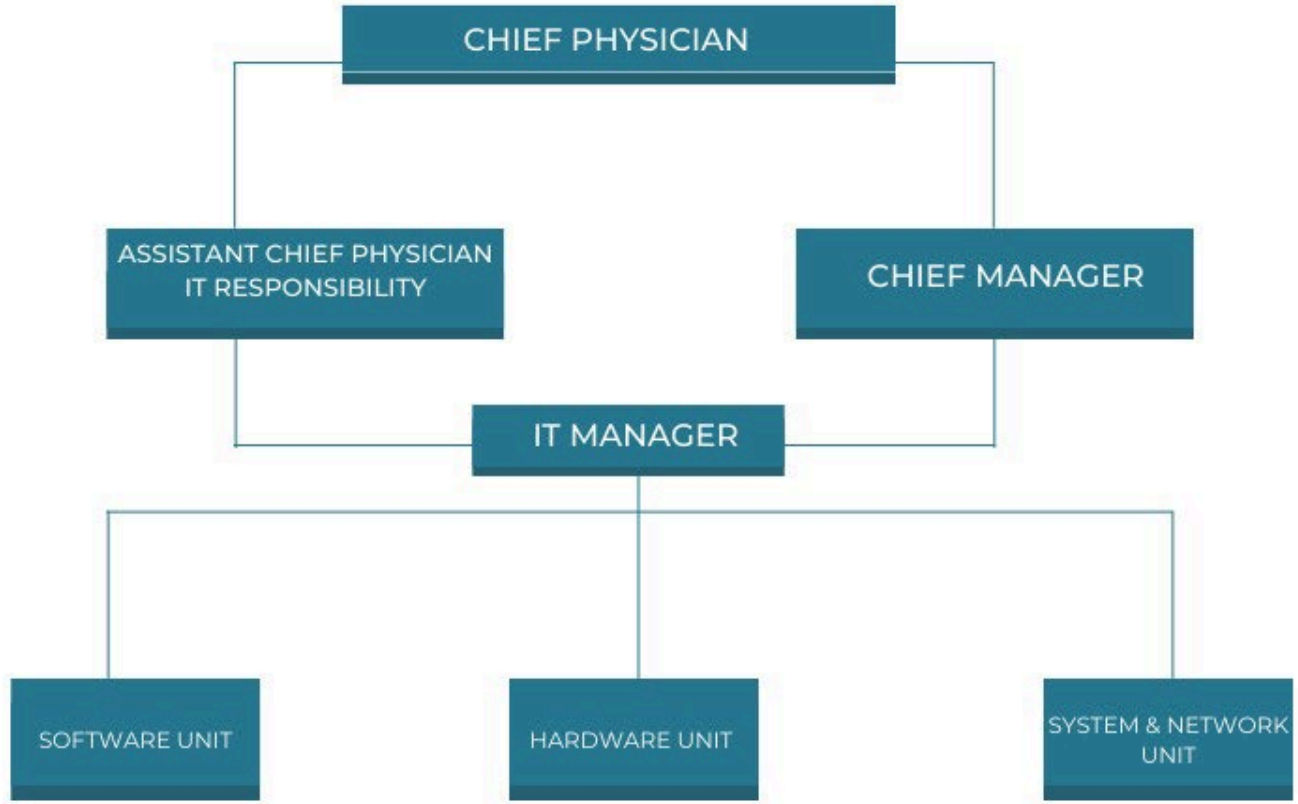
IT DEPARTMENT OF MCBU HSH



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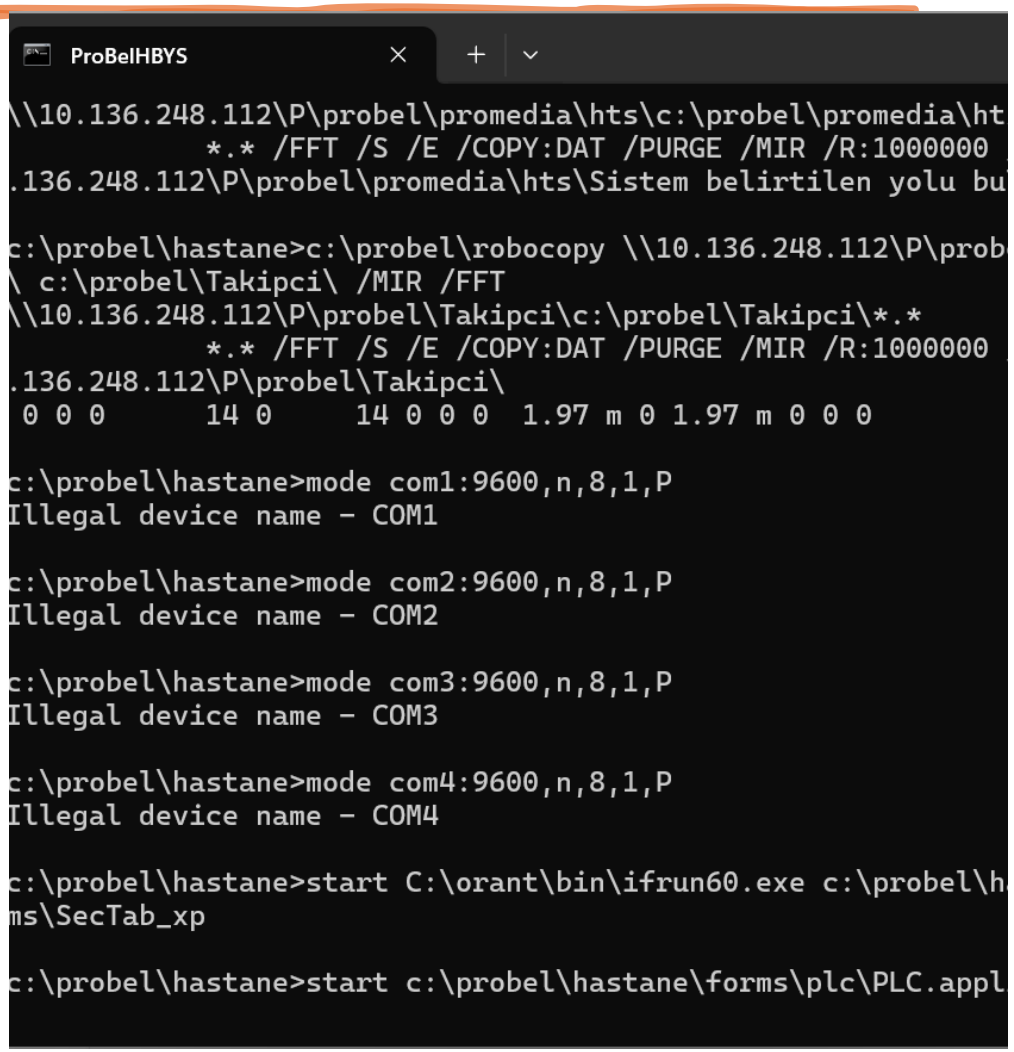
MCBU-HSH IT Department

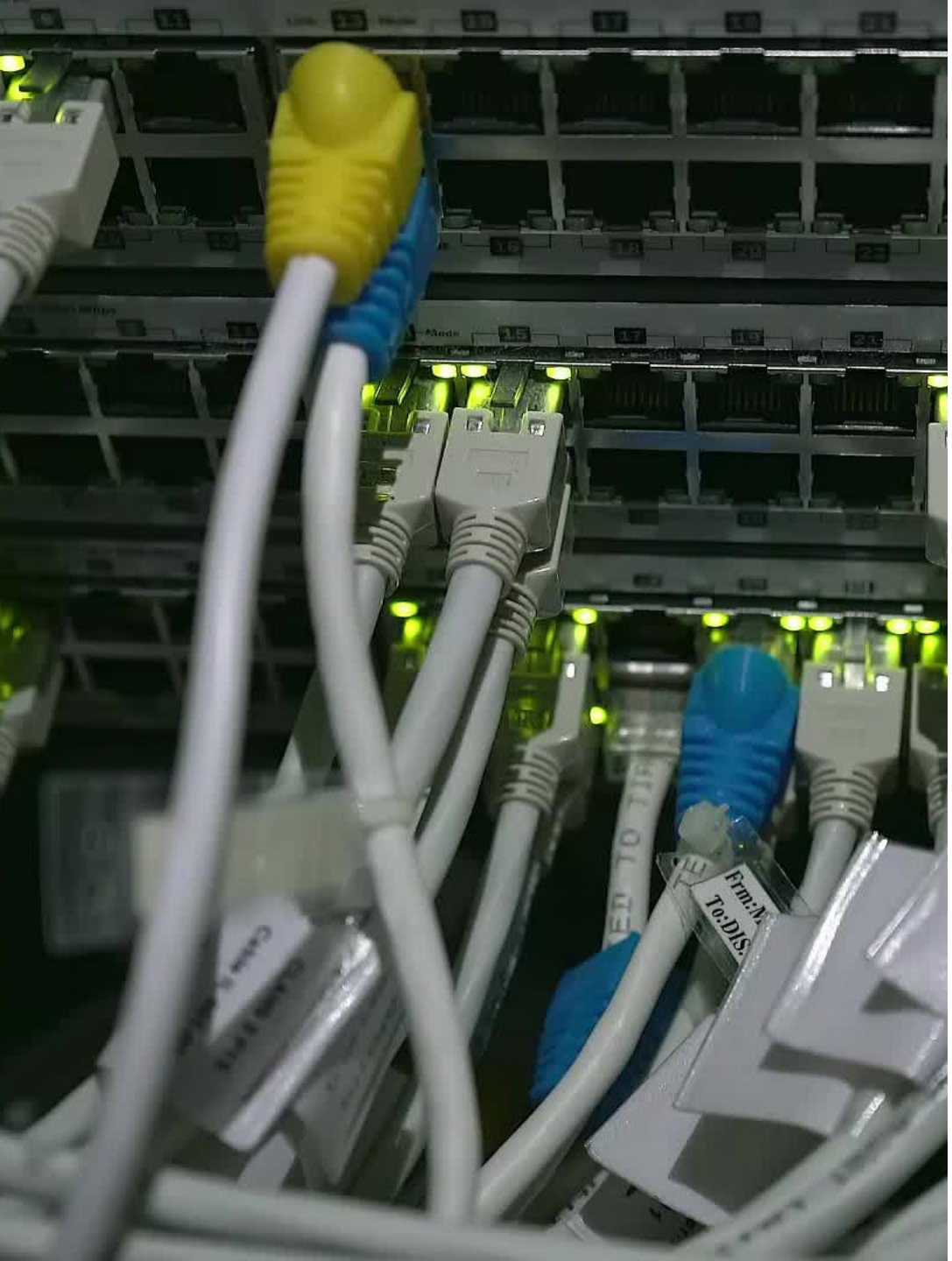
We have three common main units in IT Dept.

- Software Unit
- Hardware Unit
- System and Network Administration

Software Unit

- This unit gives support to HIS/RIS. They don’t code any software. they prepare queries to give some statistics and reports
- HIS (Hospital Information System)/RIS (Radiology Information System) software was purchased from a company outside the organisation through service procurement.
- 5 support specialist of company works in our hospital.





System & Network Unit

- This unit is responsible for core systems, security, system and network.
- They are always on call for 24/7. They have to perform system maintenance at the least-busy times of the night and the weekend.
- In this unit we have 2 technicians.

System & Network Unit

Some responsibilities of this team;

- Server maintenance
- Operating System maintenance
- System and network maintenance and upgrades
- Firewall and System Security
- Router and Switch Management

System & Network Unit

EMAIL AND INSTANT MESSAGING SYSTEMS

TEMPERATURE AND HUMIDITY MONITORING

NURSE CALLING SYSTEM

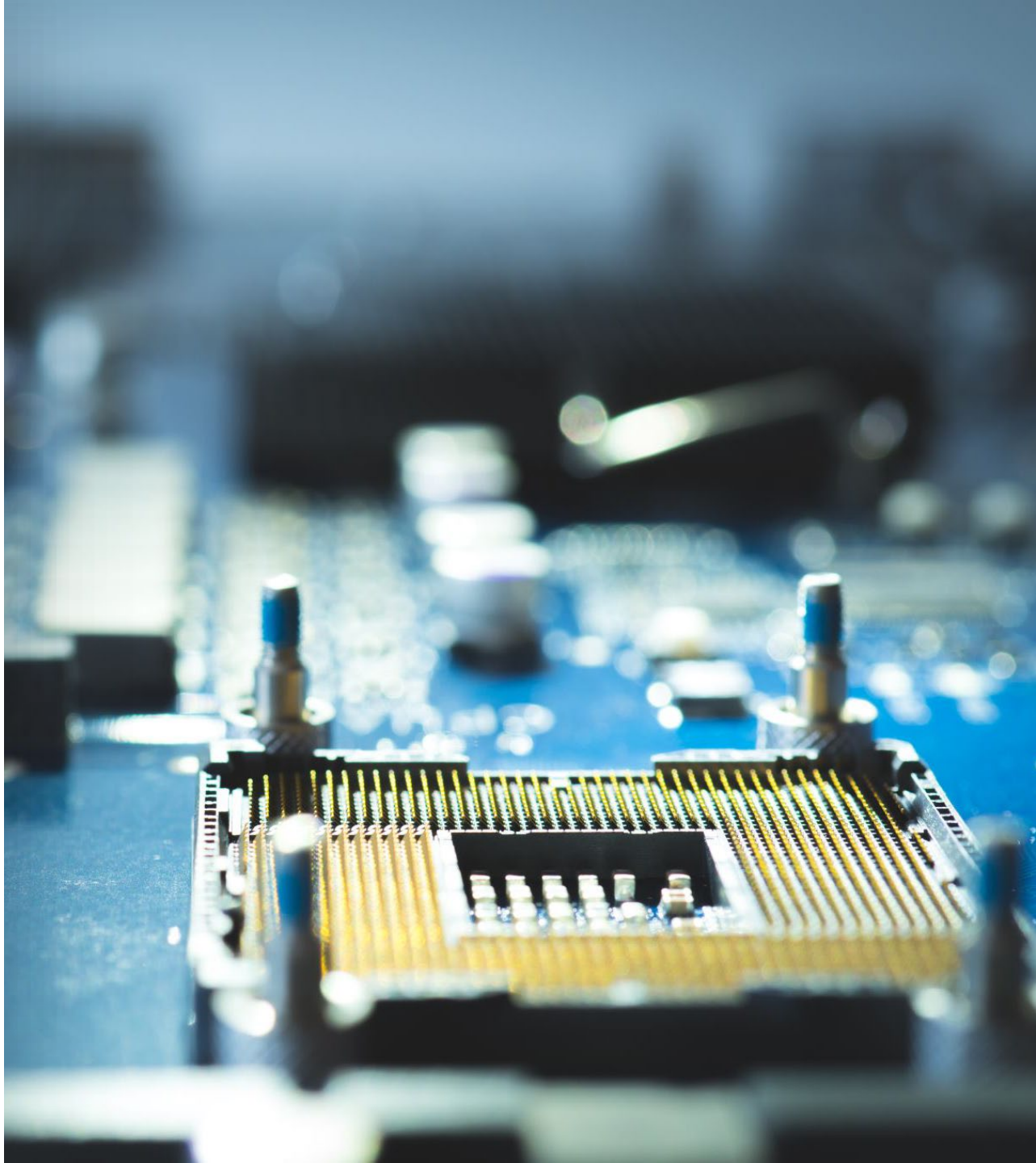
DOCUMENT MANAGEMENT SOFTWARE

PROGRAMS AND APPLICATIONS THAT DON'T FIT ANYWHERE ELSE

SOFTWARE SUPPORT EXCEPT HIS/ RIS

Hardware Unit

- Hardware Unit Staff gives desktop support, they support the PCs, laptops, printers and other devices for hospital.
- They go everywhere in our organization, and they know every cm of our organization.
- This team deals with requests for support made through the phone or help desk application in our HIS.
- In this unit we have 3 technicians.



MANİSA CELAL BAYAR ÜNİVERSİTESİ HAFSA SULTAN HASTANESİ

PROCESS INTERACTION RATING TABLE

MAIN PROCESS	SUB PROCESES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
CORPORATE SERVICES	1.Organisational Structure	A	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	2.Quality Management	C	A	C	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
	3.Risk Managemenet	c	C	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	C	B	B	B	C	B	B	B
	4.Social Responsibility	C	B	B	A	A	B	A	A	C	C	C	C	C	C	C	A	A	A	A	B	B	A	B	A	A	A	A	A	B
PATIENT and STAFF FOCUSED SERVICES	5.Human Resources	c	c	B	C	A	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	B	C
	6.End of Life Services	C	B	B	B	B	A	B	B	C	C	C	C	B	C	C	C	C	A	A	A	A	C	B	C	B	B	B	A	A
	7.Patient Rights	c	B	B	A	A	A	A	B	C	C	C	C	C	C	C	C	C	A	B	C	C	A	B	B	B	A	A	A	C
	8.Staff Rights and Safety	C	C	C	B	C	A	B	A	B	B	B	B	B	B	B	A	B	B	B	B	B	B	B	A	B	B	B	B	B
HEALTHCARE SERVICES	9.Inpatient	c	B	B	B	C	C	C	C	A	C	C	C	C	B	C	C	C	C	C	C	C	C	C	C	C	C	C	B	C
	10.Outpatient	C	B	B	C	C	A	A	C	C	A	C	C	C	B	B	B	B	B	B	C	C	C	C	C	C	C	B	B	C
	11.Emergency Patient	C	B	C	B	B	C	C	C	C	C	A	C	B	B	C	C	C	C	C	C	C	C	C	B	C	C	C	A	B
	12.Maternity Services	C	B	B	B	B	B	B	B	C	C	C	A	B	B	B	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	13.Psychiatry	C	B	C	C	B	B	C	C	C	C	C	C	A	B	C	C	B	B	B	C	C	C	C	C	C	C	C	A	C
	14.Dialysis	C	B	B	B	B	B	B	B	C	C	C	B	B	A	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	15.Intensive Care	C	B	C	B	C	C	B	B	C	B	C	B	B	C	A	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	16.Pharmacy	C	B	B	A	B	B	C	C	C	B	C	C	C	C	C	A	C	A	B	C	B	C	C	A	C	C	C	C	C
	17.Operation Rooms	C	B	B	B	C	C	C	C	C	A	C	C	B	B	C	C	A	C	C	C	C	C	C	B	C	C	C	C	C
	18.Sterilization	C	B	B	A	C	B	B	C	C	C	C	C	C	C	C	A	C	A	A	A	A	C	C	B	C	C	C	B	C
	19.Transfusion	C	B	C	A	A	A	B	C	C	C	C	C	C	C	C	A	C	A	A	B	C	B	C	A	C	C	C	C	A
	20.Radiology	C	B	B	A	B	A	B	C	C	C	C	C	C	C	C	B	C	B	A	A	B	C	C	A	C	C	B	C	C
	21.Laboratories	C	B	B	A	B	A	B	C	C	C	C	C	C	C	C	A	C	A	C	A	A	C	C	B	B	C	C	C	C
SUPPORT SERVICES	22.Facility Management	C	B	C	A	B	B	A	B	B	B	B	B	B	B	B	B	C	B	B	B	B	A	C	B	C	B	B	C	C
	23.INFORMATION MANAGEMENT	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	A	C	C	C	C	C	C
	24.Archieve	C	B	B	A	A	B	B	B	C	A	A	C	C	A	C	B	B	A	B	A	B	A	C	A	A	A	A	A	A
	25. SCM	C	B	B	A	B	B	B	B	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	A	C	C	B	C
	26.Clinical Engineering	C	B	B	A	A	A	A	A	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	B	A	B	C	A
	27.Waste Management	C	B	B	A	C	A	B	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	B	C	B	C	A	C	C
	28.Outsourcing	C	B	B	A	B	A	A	A	C	C	C	C	C	C	C	B	C	B	C	C	C	B	C	A	A	B	C	A	C
	29.Accommodation Services	C	B	B	C	A	B	C	C	c	C	C	C	C	C	C	C	A	C	C	A	B	C	B	A	C	A	C	C	A
		AFFECTED																												AFFECTING

A	INACTIV
B	INDIRECT IMPACT
C	DIRECT IMPACT

Data Regulation

- Personal Data: Refers to any information relating to an identified or identifiable natural person.
- Sensitive Personal Data: Information on race, religion, health, ethnic origin, political opinion, membership, criminal conviction, etc.

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Data Regulation

- The General Data Protection Regulation (GDPR) is a comprehensive data protection law enacted by the European Union (EU) in 2016 and enforced starting May 25, 2018.
- Regulation for personal data, Law No. 6698 on the Protection of Personal Data was enacted on 24 March 2016 and enforced starting Apr 7, 2016 in Türkiye

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Data Protection

- Accessibility
- Integrity
- Privacy

Damage to these properties creates a vulnerability in information security. Vulnerabilities that will occur; causes loss of work, time, trust and money on behalf of the person and the organization.

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What we should do/do for the protection?

Access Restricts : We authorize access to data with defined roles, as staff roles

Physical Security: Physically protecting every place with data from unauthorised access and ensuring privacy. (Also from fire, theft, flood, etc.)

System Security: Its problem for IT, who cares ☺

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What we should do/do for the protection?

- Computer Security:

We also need to pay attention to the computers of facility we use for data processing.

We should use firewall and antivirüs applications, update OS, be careful against phishing with e-mails, use strong passwords and many other precautions

- Backup

Our units make back-ups for both our systems and the information they contain.

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IT Department

- **Recognising how valuable information is**, we are very careful to protect it and we implement all measures together with integrity.

- We provide regular trainings to all our staff for awareness. Because the weakest link in this process is always the user.

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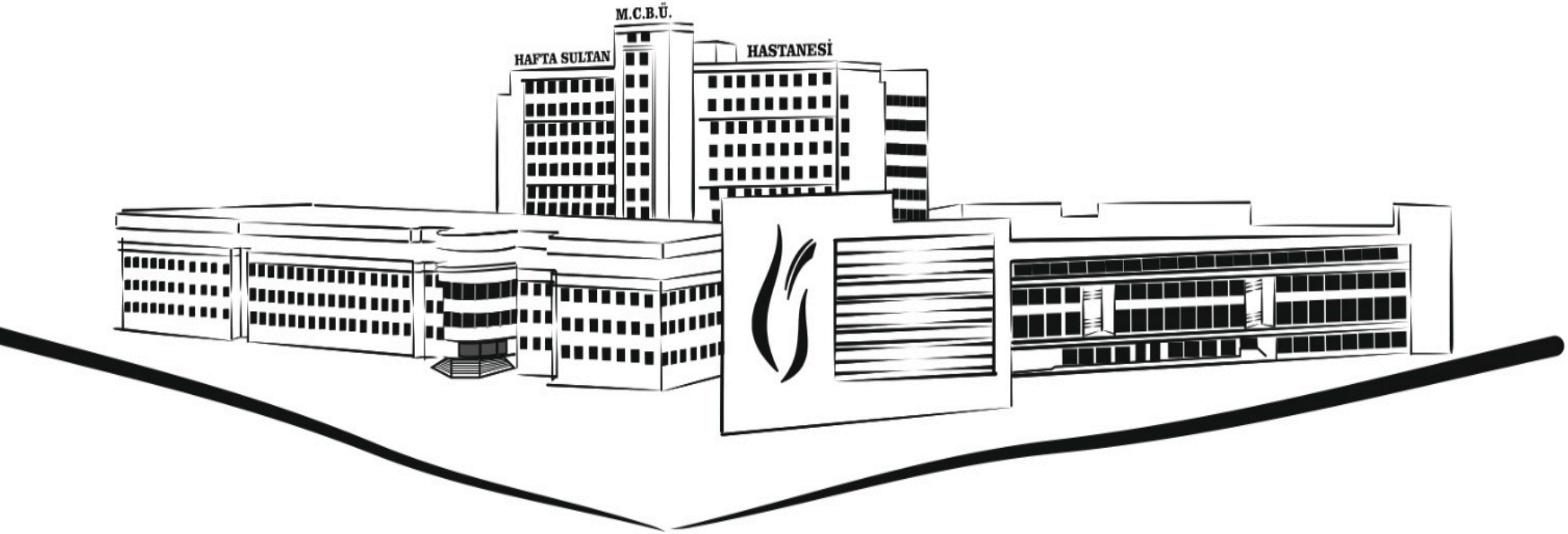

THANKS ☺

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