

Bsc/HND Computing Portfolio

Designing and Implementing a Database for Health is Wealth (A&E Department)

Database Application Development, Assignment One.

ACCA5026

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Assignment is 50% of the module.

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Introduction

This database is used for providing information about the shifts of every receptionist, nurse and doctor that goes on shift and performs their important tasks in regard to patients within their ward / unit.

Database Design

A database before implemented requires it to be designed to avoid design flaws or mistakes that can easily be made from an oversight or the lack of thought.

The more thought that a database goes through and development in its design phase, the less likely data is redundant.

Normal Form (NF)

The following is the process of reducing the repetition of information which is to depict accurate and realistic records of information. This process is known as normal form.

Before the hospital's database model is implemented for their staff, it must be designed to reduce redundancy.

NF0

These are the names of the fields of data that will be entered into the database:

employee_id	employee_first_name	employee_last_name
employee_address	employee_phone_no	employee_email
receptionist_id	receptionist_hours	
nurse_id	nurse_hours	doctor_id
doctor_hours	medicine_id	medicine_name
medicine_dose	medicine_interval	
admini_time	patient_id	patient_first_name
patient_last_name	patient_phone_no	patient_case_injury
patient_dob	patient_condition	patient_email
emergency_first_name	emergency_last_name	emergency_email
emergency_phone_no	emergency_address	emergency_dob
admissions_id	admissions_status	
admissions_arrival	admissions_departure	shift_schedule_id
shift_date	shift_time	shift_job
		shift_hourly
		shift_overtime
shift_timeoff	shift_required_hours	current_shift_id
shift_clock_id	shift_duration	shift_time_in
shift_time_out	shift_break_start	shift_break_end
unit_id	unit_type	unit_floor_level
		unit_room_no
		unit_beds

NF1

The following is a list of tables that have primary keys identified within them shown by each table in this form:

employee_info

<u>employee_id</u>	employee_first_name	employee_last_name
	employee_address	employee_dob
	employee_email	

current_shift

<u>current_shift_id</u>	shift_duration	shift_time_in
	shift_break_start	shift_break_end
	shift_time_out	

nurses

<u>nurse_id</u>	nurse_hours
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doctors

<u>doctor_id</u>	doctor_hours
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receptionists

<u>receptionist_id</u>	receptionist_hours
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admissions

<u>admissions_id</u>	admissions_status	admissions_arrival
	admissions_departure	

medication

<u>medicine_id</u>	medicine_name	medicine_dose
	medicine_interval	admini_time

patient_summary

<u>patient_id</u>	patient_first_name	patient_last_name
	patient_dob	patient_address
	patient_phone_no	patient_case_injury
	patient_condition	patient_email

emergency_summary

<u>emergency_id</u>	emergency_first_name	patient_last_name
	emergency_dob	emergency_address
	emergency_phone_no	emergency_case_injury
	emergency_condition	emergency_email

unit

<u>unit_id</u>	unit_type	unit_floor_level
	unit_room_no	unit_beds

shift_schedule

<u>shift_Schedule_id</u>	shift_date	shift_time	shift_job
	shift_hourly	shift_overtime	shift_timeoff
	shift_required_hours		

NF2

The following is a list of tables that have foreign keys related into relevant tables where information is linked for retrieving information and further reducing redundant information.

employee_info

<u>employee_id</u>	employee_first_name	employee_last_name
	employee_address	employee_dob
	employee_email	

nurses

<u>nurse_id</u>	employee_id	nurse_hours
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doctors

<u>doctor_id</u>	employee_id	doctor_hours
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receptionists

<u>receptionist_id</u>	employee_id	receptionist_hours
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admissions

<u>admissions_id</u>	receptionist_id	doctor_id
	admissions_status	admissions_arrival
	admissions_departure	

medication

<u>medicine_id</u>	medicine_name	medicine_dose
	medicine_interval	

administered_medication

<u>admini_id</u>	nurse_id	patient_id
	medicine_id	admini_time

patient_case

<u>patient_case_id</u>	admissions_id	patient_id
	patient_case_injury	patient_condition

patient_summary

<u>patient_id</u>	emergency_id	
	patient_first_name	patient_last_name
	patient_dob	patient_address
	patient_phone_no	patient_condition
	patient_email	

emergency_summary

<u>emergency_id</u>	emergency_first_name	patient_last_name
	emergency_dob	emergency_address
	emergency_phone_no	emergency_case_injury
	emergency_condition	emergency_email

unit

<u>unit_id</u>	unit_type	unit_floor_level
	unit_room_no	unit_beds

shift_schedule

shift_schedule_id

<i>employee_id</i>	<i>unit_id</i>	
shift_date	shift_time	shift_job
shift_hourly	shift_overtime	shift_timeoff
shift_required_hours		

shift_clock

shift_clock_id

<i>employee_id</i>	
shift_time_in	shift_time_out
shift_break_start	shift_break_end

current_shift

current_shift_id

<i>shift_schedule_id</i>	<i>shift_clock_id</i>
shift_duration	

NF3

employee_summary

employee_id

employee_first_name

employee_last_name

employee_email

employee_address

employee_phone_no

nurses

nurse_id

employee_id

nurse_hours

doctors

doctor_id

employee_id

doctor_hours

receptionists

receptionist_id

employee_id

receptionist_hours

administered_medication

admini_id

nurse_id

patient_id

medicine_id

admini_time

medication

medicine_id

medicine_name

medicine_dose

medicine_interval

patient_summary

patient_id

patient_first_name	patient_last_name
patient_email	patient_address
patient_phone_no	

emergency_summary

emergency_id

emergency_first_name	emergency_last_name
emergency_email	emergency_address
emergency_phone_no	

patient_emergency_relationship

<u>patient_emergency_id</u>	<i>patient_id</i>	<i>emergency_id</i>
	patient_relationship	

unit_info

<u>unit_id</u>	<i>room_no_id</i>	
	unit_type	unit_floor_level

room_info

<u>room_no_id</u>	
	room_beds

admissions

admissions_id

receptionist_id

doctor_id

room_no_id

admissions_status

admissions_arrival

admissions_departure

patient_case

patient_case_id

admissions_id

patient_id

patient_case_injury

patient_condition

shift_schedule

shift_schedule_id

shift_wages_id

employee_id

unit_id

shift_date

shift_time

shift_wages

shift_wages_id

shift_job

shift_hourly

shift_overtime

shift_timeoff

shift_required_hours

shift_clock

shift_clock_id

employee_id

shift_time_in

shift_time_out

shift_break_start

shift_break_end

current_shift

current_shift_id

shift_wages_id

shift_clock_id

unit_id

shift_duration

employees_shift_summary

shift_summary_id

shift_clock_id

current_shift_id

shift_wages_id

shift_summary_date

shift_hourly_total

shift_overtime_total

shift_wage_total

NF3 (Indexed)

employee_name

employee_name_id

employee_id

employee_first_name

employee_last_name

employee_info

employee_info_id

employee_id

employee_email

employee_address

employee_phone_no

employee_summary

employee_id

employee_name_id

employee_info_id

nurses

nurse_id

employee_id

nurse_hours

doctors

doctor_id

employee_id

doctor_hours

receptionists

receptionist_id

employee_id

receptionist_hours

administered_medication

admini_id nurse_id patient_id medicine_id
admini_time

medication

medicine_id
medicine_name medicine_dose medicine_interval

administered_medicine_summary

adsum_m_id admini_id
medicine_total

administered_patient_summary

adsum_p_id admini_id
medicine_total

patient_name

patient_name_id patient_id
patient_first_name patient_last_name

patient_info

patient_info_id patient_id
patient_email patient_address
patient_phone_no patient_dob

patient_summary

patient_id patient_name_id patient_info_id

emergency_name

<u>emergency_name_id</u>	emergency_id	
	emergency_first_name	emergency_last_name

emergency_info

<u>emergency_info_id</u>	emergency_id	
	emergency_email	emergency_address
	emergency_phone_no	emergency_dob

emergency_summary

<u>emergency_id</u>	emergency_name_id	emergency_info_id
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patient_emergency_relationship

<u>patient_emergency_id</u>	patient_id	emergency_id
	patient_relationship	

unit_info

<u>unit_id</u>	room_no_id	
	unit_type	unit_floor_level

room_info

<u>room_no_id</u>	
	room_beds

admissions

<u>admissions_id</u>	receptionist_id	doctor_id
	room_no_id	
	admissions_status	admissions_arrival
	admissions_departure	

patient_case

<u>patient_case_id</u>	admissions_id	patient_id
	patient_case_injury	patient_condition

shift_schedule

shift_schedule_id

shift_wages_id

employee_id

unit_id

shift_date

shift_time

shift_wages

shift_wages_id

shift_job

shift_hourly

shift_overtime

shift_timeoff

shift_required_hours

shift_clock

shift_clock_id

employee_id

shift_time_in

shift_time_out

shift_break_start

shift_break_end

current_shift

current_shift_id

shift_wages_id

shift_clock_id

unit_id

shift_duration

employees_shift_summary

shift_summary_id

shift_clock_id

current_shift_id

shift_wages_id

shift_summary_date

shift_hourly_total

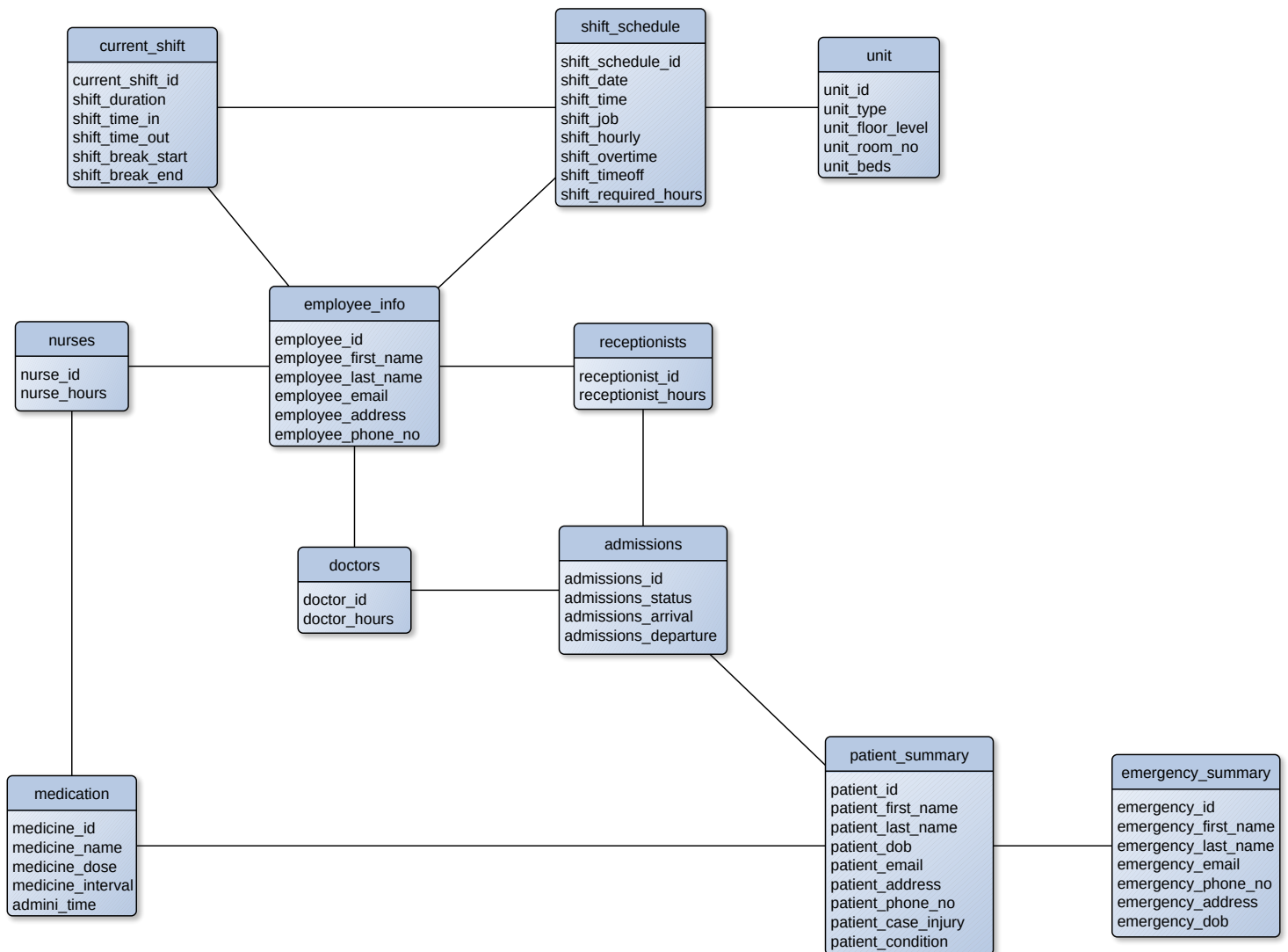
shift_overtime_total

shift_wage_total

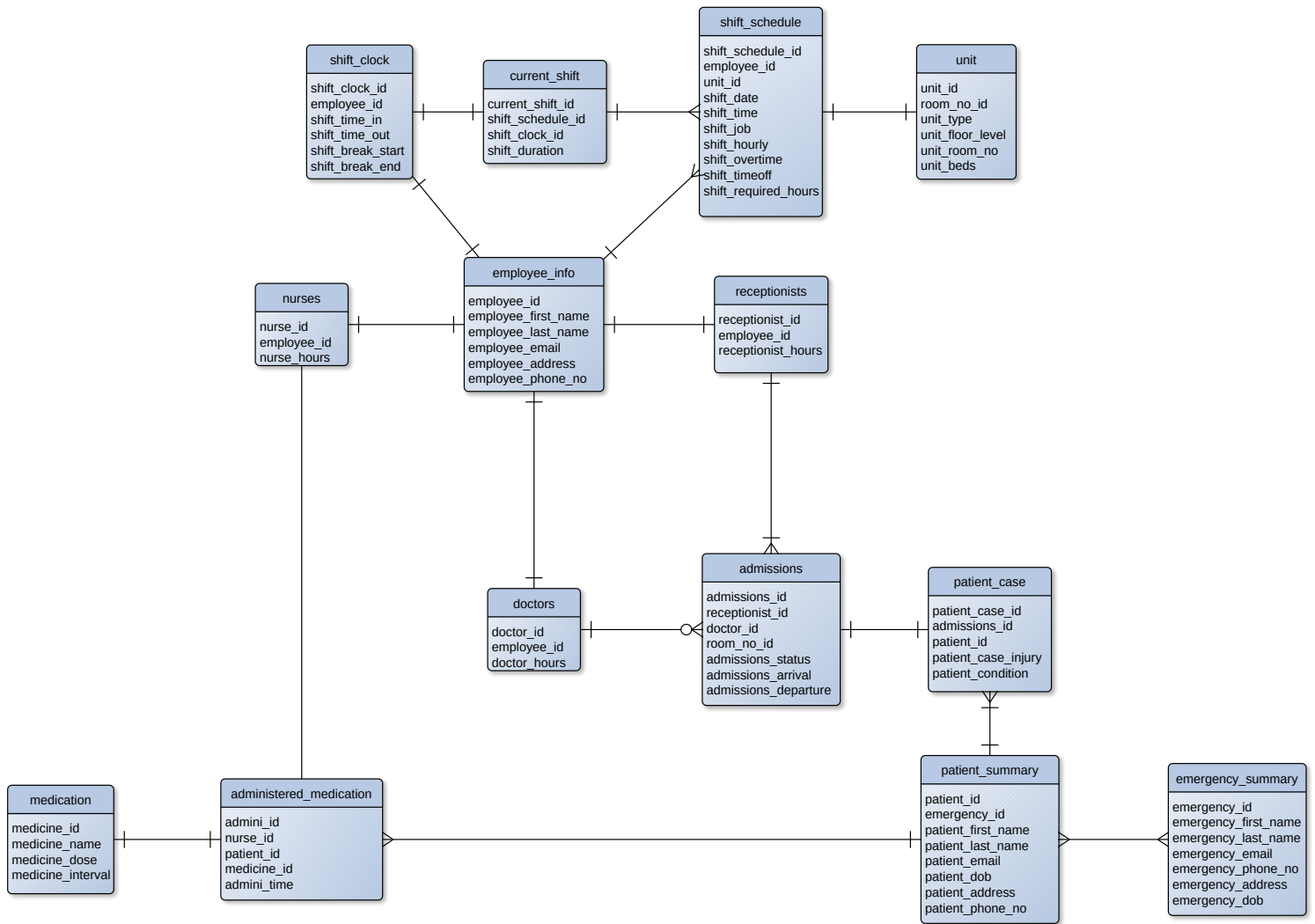
Entity Relationship Diagram (ERD)

The following is a visual depiction of normal forms from 1 through 3 designed in yEd Graph software.[1]

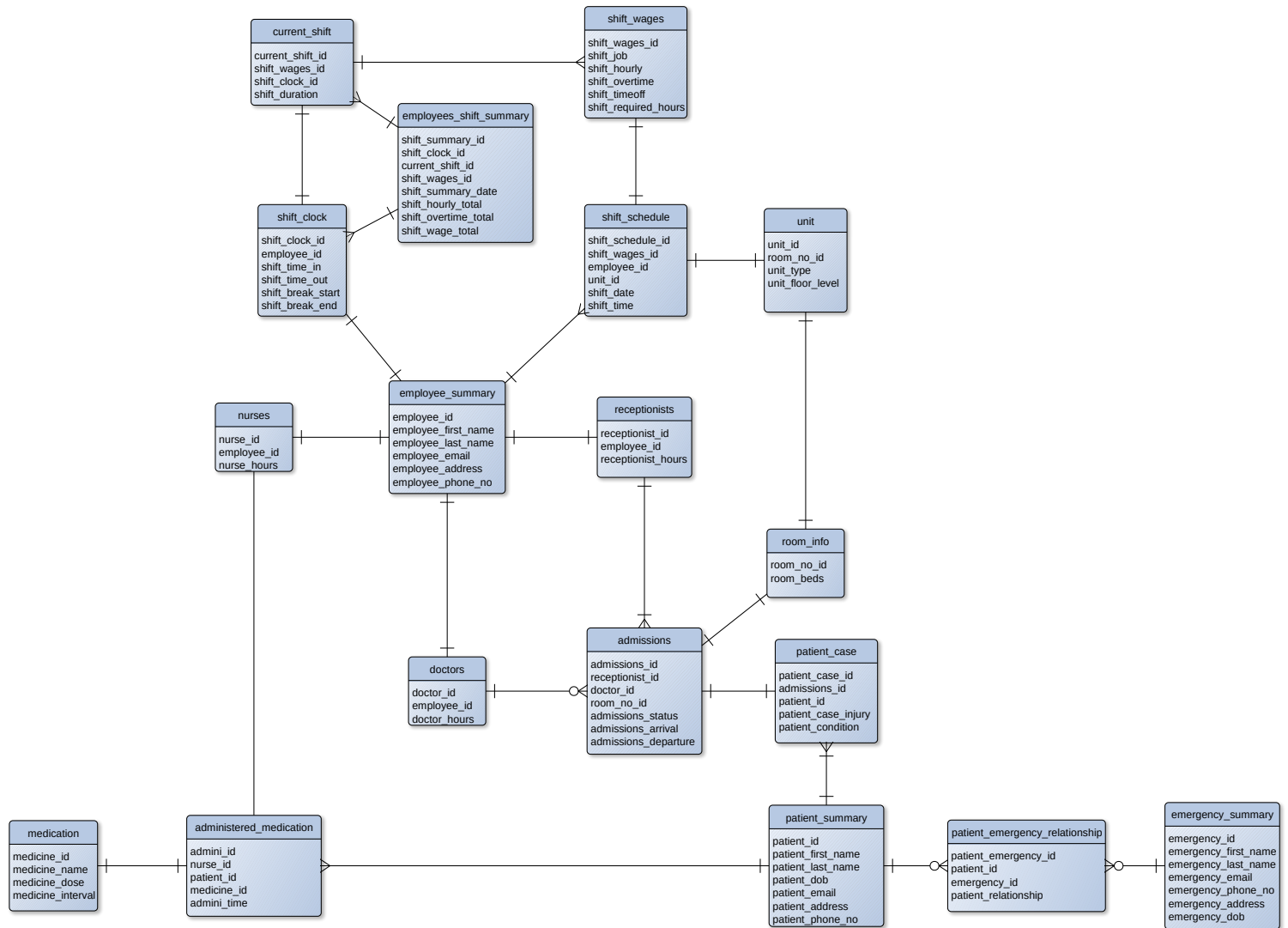
ERD—NF1



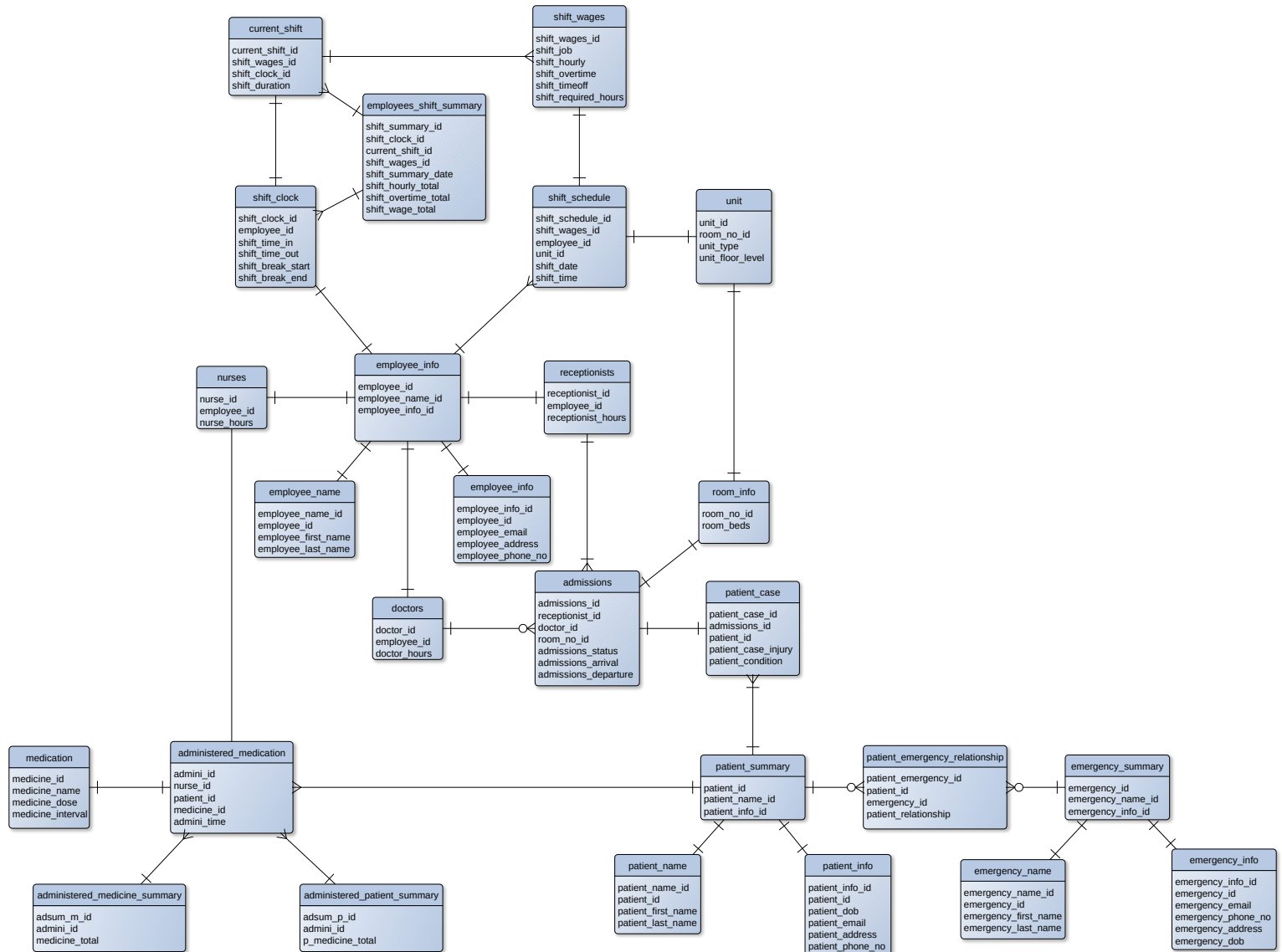
ERD—NF2



ERD—NF3



ERD—NF3 (Indexed)



Performance Tuning

To increase the efficiency of how the database reads fields searching for specific information, indexing would need to be done. This is the process of splitting information up and searching for specific info based on the ID, as opposed to going row-by-row, and column-by-column – which overtime slows down the server as the database increases in size per row and column. This results in a bad end-user experience with the app which uses a large database without indexing anything.

Fields that are going to be queried everyday is patient, employee and emergency contact information. Splitting the name and address, email and phone number will release a big load from the database.

Bibliography

1: yWorks, yEd - Graph Editor, N/A,
<https://www.yworks.com/products/yed/download>