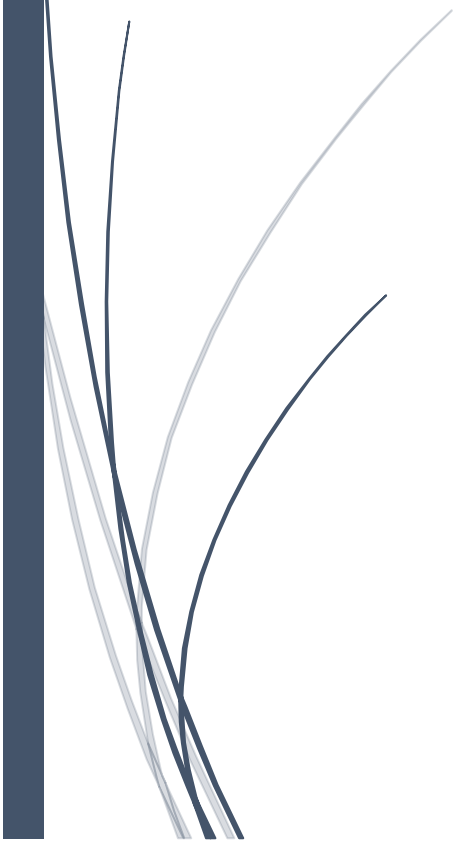
LAB 11 - FUNCTIONAL DEPENDENCIES AND NORMALIZATION

GROUP 1: 202012001-04_202018001-02

PROJECT TITLE: ONLINE MEDICAL CONSULTATION SYSTEM

JANU SHAH	202012001
DEEPAK MAIDASANI	202012002
KUSH MODI	202012003
NIHARIKA SRIVASTAVA	202012004
KUNAL PANJWANI	202018001



1) Hospital (Registration_Id, name, Digital_Signature)

Candidate Key:
Registration_Id

Functional Dependencies:
Registration_Id → name
Registration_Id → Digital_Signature

$\{Registration\_Id\}^+ = \{Registration\_Id, name, Digital\_Signature\}$

Normal Form:

- There is no multivalued attribute present in the relation, hence it satisfies 1NF condition.
- All the attributes in the relation can be determined by the candidate key i.e. Registration_Id and for every functional dependency of the relation, Candidate Key is Super key. Hence it satisfies BCNF condition.
- Since this relation satisfies BCNF condition, we don't need to check further for 3NF and 2NF conditions.
- **Therefore, this relation is in BCNF form.**

2) State (stateId, name)

Candidate Key:
stateId

Functional Dependencies:
stateId → name

$\{stateId\}^+ = \{stateId,name\}$

Normal Form:

- There is no multivalued attribute present in the relation, hence it satisfies 1NF condition.
- All the attributes in the relation can be determined by the candidate key i.e. stateId and for every functional dependency of the relation, Candidate Key is Super key. Hence it satisfies BCNF condition.
- Since this relation satisfies BCNF condition, we don't need to check further for 3NF and 2NF conditions.
- **Therefore, this relation is in BCNF form.**

3) City (cityId, name, stateId)

Candidate Key:
cityId

Functional Dependencies:
cityId → name
cityId → stateId

$\{cityId\}^+ = \{cityId, name, stateId\}$

Normal Form:

- There is no multivalued attribute present in the relation, hence it satisfies 1NF condition.
- All the attributes in the relation can be determined by the candidate key i.e. cityId and for every functional dependency of the relation, Candidate Key is Super key. Hence it satisfies BCNF condition.

- Since this relation satisfies BCNF condition, we don't need to check further for 3NF and 2NF conditions.
- **Therefore, this relation is in BCNF form.**

4) Hospital Branch (branchId, contactNumber, emailId, address, stamp, registrationId, cityId)

Candidate Key:
branchId

Functional Dependencies:
branchId → contactNumber
branchId → emailId
branchId → address
branchId → stamp
branchId → registrationId
branchId → cityId

$\{branchId\}^+$ = {branchId, contactNumber, emailId, address, stamp, registrationId, cityId}

Normal Form:
- There is no multivalued attribute present in the relation, hence it satisfies 1NF condition.
- All the attributes in the relation can be determined by the candidate key i.e. branchId and for every functional dependency of the relation, Candidate Key is Super key. Hence it satisfies BCNF condition.
- Since this relation satisfies BCNF condition, we don't need to check further for 3NF and 2NF conditions.
- **Therefore, this relation is in BCNF form.**

5) Medical Branch (medicalBranchId, name, description)

Candidate Key:
medicalBranchId

Functional Dependencies:
medicalBranchId→ name
medicalBranchId→description

$\{medicalBranchId\}^+$ = {medicalBranchId, name, description}

Normal Form:
- There is no multivalued attribute present in the relation, hence it satisfies 1NF condition.
- All the attributes in the relation can be determined by the candidate key i.e. medicalBranchId and for every functional dependency of the relation, Candidate Key is Super key. Hence it satisfies BCNF condition.
- Since this relation satisfies BCNF condition, we don't need to check further for 3NF and 2NF conditions.
- **Therefore, this relation is in BCNF form.**

6) HBranch_has_MBranch (Branch_Id, Medical_Branch_Id)

Candidate Key:
{Branch_Id, Medical_Branch_Id}

Functional Dependencies:

{Branch_Id, Medical_Branch_Id} → {Branch_Id, Medical_Branch_Id}

Normal Form:

- There is no multivalued attribute present in the relation, hence it satisfies 1NF condition.
- There is a trivial functional dependency which is the only functional dependency in this relation.
- Since this relation satisfies BCNF condition, we don't need to check further for 3NF and 2NF conditions.
- **Therefore, this relation is in BCNF form.**

7) FAQ (faqId, question, answer, registerationId)

Candidate Key:
faqId

Functional Dependencies:
faqId → question
faqId → answer
faqId → registerationId

$\{faqId\}^+ = \{faqId, question, answer, registerationId\}$

Normal Form:

- There is no multivalued attribute present in the relation, hence it satisfies 1NF condition.
- All the attributes in the relation can be determined by the candidate key i.e. faqId and for every functional dependency of the relation, Candidate Key is Super key. Hence it satisfies BCNF condition.
- Since this relation satisfies BCNF condition, we don't need to check further for 3NF and 2NF conditions.
- **Therefore, this relation is in BCNF form.**

8) Doctor (doctorId, firstName, lastName, qualification, specialization, experience, dateOfBirth, gender, mobileNumber, address, emailId, password, chargePerConsultation, medicalLicense, digitalSignature, rating, photo, idProof, branchId, medicalBranchId)

Candidate Key:
doctorId

Functional Dependencies:
doctorId → name
doctorId →firstName
doctorId →lastName
doctorId →qualification
doctorId →specialization
doctorId →experience
doctorId →dateOfBirth
doctorId →gender
doctorId →mobileNumber
doctorId →address
doctorId →emailId
doctorId →password
doctorId →chargePerConsultation
doctorId →medicalLicense
doctorId →digitalSignature
doctorId →rating
doctorId →photo
doctorId →idProof

doctorId →branchId
doctorId →medicalBranchId

{doctorId}$^+$ = {doctorId, firstName, lastName, qualification, specialization, experience, dateOfBirth, gender, mobileNumber, address, emailId, password, chargePerConsultation, medicalLicense, digitalSignature, rating, photo, idProof, branchId, medicalBranchId}

Normal Form:

- There is no multivalued attribute present in the relation, hence it satisfies 1NF condition.
- All the attributes in the relation can be determined by the candidate key i.e. doctorId and for every functional dependency of the relation, Candidate Key is Super key. Hence it satisfies BCNF condition.
- Since this relation satisfies BCNF condition, we don't need to check further for 3NF and 2NF conditions.
- **Therefore, this relation is in BCNF form.**

9) DoctorLanguagesKnown (doctorId, languageKnown)

Candidate Key:
{doctorId, languageKnown}

Functional Dependencies:
{doctorId, languageKnown} → {doctorId, languageKnown}

{doctorId, languageKnown}$^+$ = {doctorId, languageKnown}

Normal Form:

- There is no multivalued attribute present in the relation, hence it satisfies 1NF condition.
- There is a trivial functional dependency which is the only functional dependency in this relation.
- Since this relation satisfies BCNF condition, we don't need to check further for 3NF and 2NF conditions.
- **Therefore, this relation is in BCNF form.**

10) AvailabilityOfDoctor (availabilityId, weekDay, numberOfDays, startTime, endTime, doctorId)

Candidate Key:
availabilityId

Functional Dependencies:
availabilityId → weekday
availabilityId → numberOfDays
availabilityId → startTime
availabilityId → endTime
availabilityId → doctorId

{availabilityId}$^+$ = {availabilityId, weekDay, numberOfDays, startTime, endTime, doctorId}

Normal Form:

- There is no multivalued attribute present in the relation, hence it satisfies 1NF condition.
- All the attributes in the relation can be determined by the candidate key i.e. availabilityId and for every functional dependency of the relation, Candidate Key is Super key. Hence it satisfies BCNF condition.
- Since this relation satisfies BCNF condition, we don't need to check further for 3NF and 2NF conditions.
- **Therefore, this relation is in BCNF form.**

11) Patient (Patient_Id, First_Name, Last_Name, D.O.B, Gender, Mobile_Number, Address, Email_Id, Password, Height, Weight, Allergies, Medical_History, Photo, ID_Proof)

Candidate Key:
Patient_Id

Functional Dependencies:
Patient_Id → First_Name
Patient_Id → Last_Name
Patient_Id → D.O.B
Patient_Id → Gender
Patient_Id → Mobile_Number
Patient_Id → Address
Patient_Id → Email_Id
Patient_Id → Password
Patient_Id → Height
Patient_Id → Weight
Patient_Id → Allergies
Patient_Id → Medical_History
Patient_Id → Photo
Patient_Id → ID_Proof

$(Patient\_Id)^+$ = { Patient_Id, First_Name, Last_Name, D.O.B, Gender, Mobile_Number, Address, Email_Id, Password, Height, Weight, Allergies, Medical_History, Photo, ID_Proof}

Normal Form:

- There is no multivalued attribute present in the relation, hence it satisfies 1NF condition.
- All the attributes in the relation can be determined by the candidate key i.e. patientId and for every functional dependency of the relation, Candidate Key is Super key. Hence it satisfies BCNF condition.
- Since this relation satisfies BCNF condition, we don't need to check further for 3NF and 2NF conditions.
- **Therefore, this relation is in BCNF form.**

12) Laboratory (labId, labname, contactNumber, address, emailId, branchId)

Candidate Key:
labId

Functional Dependencies:
labId→ labname
labId→contactNumber
labId→ address
labId→emailId
labId→ branchId

$\{labId\}^+$ = {labId, labname, contactNumber, address, emailId, branchId}

Normal Form:

- There is no multivalued attribute present in the relation, hence it satisfies 1NF condition.
- All the attributes in the relation can be determined by the candidate key i.e. labId and for every functional dependency of the relation, Candidate Key is Super key. Hence it satisfies BCNF condition.
- Since this relation satisfies BCNF condition, we don't need to check further for 3NF and 2NF conditions.
- **Therefore, this relation is in BCNF form.**

13) Appointment (Appointment_Id, Date_of_Appointment, Time_of_Appointment, Symptoms, Appointment_Status, Duration_of_Appointment, Doctor_Id, Patient_Id, Lab_Id)

Candidate key:
Appointment_Id

Functional Dependencies:
Appointment_Id → Date_of_Appointment
Appointment_Id → Time_of_Appointment
Appointment_Id → Symptoms
Appointment_Id → Appointment_Status
Appointment_Id → Duration_of_Appointment
Appointment_Id → Doctor_Id
Appointment_Id → Patient_Id
Appointment_Id → Lab_Id

$\{Appointment\_Id\}^+$ = { Appointment_Id , Date_of_Appointment, Time_of_Appointment , Symptoms , Appointment_Status, Duration_of_Appointment, Doctor_Id, Patient_Id, Lab_Id}

Normal Form:

- There is no multivalued attribute present in the relation, hence it satisfies 1NF condition.
- All the attributes in the relation can be determined by the candidate key i.e. Appointment_Id and for every functional dependency of the relation, Candidate Key is Super key. Hence it satisfies BCNF condition.
- Since this relation satisfies BCNF condition, we don't need to check further for 3NF and 2NF conditions.
- **Therefore, this relation is in BCNF form.**

14) Payment (Transaction_Id, Transaction_Amount, Payment_Gateway, Refund, Appointment_Id)

Candidate key:
Transaction_Id

Functional Dependencies:
Transaction_Id → Transaction_Amount
Transaction_Id → Payment_Gateway
Transaction_Id → Refund
Transaction_Id → Appointment_Id
$(Transaction\_Id)^+$ = {Transaction_Id, Transaction_Amount, Payment_Gateway, Refund, Appointment_Id}

Normal Form:

- There is no multivalued attribute present in the relation, hence it satisfies 1NF condition.
- All the attributes in the relation can be determined by the candidate key i.e. Transaction_Id and for every functional dependency of the relation, Candidate Key is Super key. Hence it satisfies BCNF condition.
- Since this relation satisfies BCNF condition, we don't need to check further for 3NF and 2NF conditions.
- **Therefore, this relation is in BCNF form.**

15) Pharmacy (pharmacyId, pharmacyname, contactNumber, address, emailId, websiteUrl)

Candidate Key:
pharmacyId

Functional dependencies:
pharmacyId→ pharmacyname

pharmacyId→contactNumber
pharmacyId→ address
pharmacyId→emailId
pharmacyId→ websiteUrl

$\{pharmacyId\}^+$ = {pharmacyId, pharmacyname, contactNumber, address, emailId, websiteUrl}

Normal Form:

- There is no multivalued attribute present in the relation, hence it satisfies 1NF condition.
- All the attributes in the relation can be determined by the candidate key i.e. pharmacyId and for every functional dependency of the relation, Candidate Key is Super key. Hence it satisfies BCNF condition.
- Since this relation satisfies BCNF condition, we don't need to check further for 3NF and 2NF conditions.
- **Therefore, this relation is in BCNF form.**

16) Patient_Record (Patient_Id, Appointment_Id, Doctor's_Observations, Doctor's_Diagnosis, Ordered_Medicine, Lab_Report, Digital_Presciption, Pharmacy_Id)

Candidate key:
{Patient_Id, Appointment_Id}

Functional Dependencies:
{Patient_Id, Appointment_Id} → Doctor's_Observations
{Patient_Id, Appointment_Id} → Doctor's_Diagnosis
{Patient_Id, Appointment_Id} → Ordered_Medicine
{Patient_Id, Appointment_Id} → Lab_Report
{Patient_Id, Appointment_Id} → Digital_Prescription
{Patient_Id, Appointment_Id} → Pharmacy_Id

$\{Patient\_Id, Appointment\_Id\}^+$ ={ Patient_Id, Appointment_Id , Doctor's_Observations, Doctor's_Diagnosis, Ordered_Medicine, Lab_Report , Digital_Presciption, Pharmacy_Id}

Normal Form:

- There is no multivalued attribute present in the relation, hence it satisfies 1NF condition.
- All the attributes in the relation can be determined by the candidate key i.e. {Patient_Id, Appointment_Id}. Hence it satisfies BCNF condition.
- Since this relation satisfies BCNF condition, we don't need to check further for 3NF and 2NF conditions.
- **Therefore, this relation is in BCNF form.**

17) Meet_Details (Appointment_Id, Video_Conferencing_Link, Telephone_Recording_Link, Chat_Data, Doctor's Feedback)

Candidate key:
Appointment_Id

Functional Dependencies:

Appointment_Id → Video_Conferencing_Link
Appointment_Id → Telephone_Recording_Link
Appointment_Id → Chat_Data
Appointment_Id → Doctor's Feedback
$(Appointment\_Id)^+$ = {Appointment_Id , Video_Conferencing_Link, Telephone_Recording_Link, Chat_Data, Doctor's Feedback}

Normal Form:

- There is no multivalued attribute present in the relation, hence it satisfies 1NF condition.
- All the attributes in the relation can be determined by the candidate key i.e. Appointment_Id and for every functional dependency of the relation, Candidate Key is Super key. Hence it satisfies BCNF condition.
- Since this relation satisfies BCNF condition, we don't need to check further for 3NF and 2NF conditions.
- **Therefore, this relation is in BCNF form.**

18) Feedback (feedbackId, reviewByPatient, rating, patientId, appointmentId)

Candidate Key:
feedbackId

Functional dependencies:
feedbackId→ reviewByPatient
feedbackId→rating
feedbackId→ patientId
feedbackId→appointmentId

$\{feedbackId\}^+$ = {feedbackId, reviewByPatient, rating, patientId, appointmentId}

Normal Form:
- There is no multivalued attribute present in the relation, hence it satisfies 1NF condition.
- All the attributes in the relation can be determined by the candidate key i.e. feedbackId and for every functional dependency of the relation, Candidate Key is Super key. Hence it satisfies BCNF condition.
- Since this relation satisfies BCNF condition, we don't need to check further for 3NF and 2NF conditions.
- **Therefore, this relation is in BCNF form.**