USERS

Attribute	Symbol
UserID	A
FullName	B
Gender	C
Email	D
PasswordHash	E
PhoneNumber	F
UserRole	G
ProfilePic	H
CreatedAt	I

Functional Dependencies:

- **1.** A → B, C, D, E, F, G, H, I
- **2.** D → A *(Email is unique)*

Candidate Key(s):

- A (UserID — surrogate primary key)
- D (Email — unique constraint)

Normalization:

- 1NF: Yes — all attributes are atomic
- 2NF: Yes — PK is A, all non-prime attributes fully dependent on A
- 3NF: Yes — no transitive dependency (D → A is fine because D is a candidate key)
- BCNF: Yes — every determinant (A, D) is a candidate key

CATEGORIES

Attribute	Symbol
CategoryID	A
CategoryName	B

Functional Dependencies:

- A → B
- B → A *(CategoryName is unique)*

Candidate Key(s):

- A (CategoryID — surrogate primary key)
- B (CategoryName — unique constraint)

Normalization:

- 1NF: Yes
- 2NF: Yes — single-attribute key
- 3NF: Yes — no transitive dependencies
- BCNF: Yes — all determinants are candidate keys

ITEMS

Attribute	Symbol

ItemID	A
UserID (FK)	B
Title	C
Description	D
CategoryID (FK)	E
ItemLocation	F
DateReported	G
ImageURL	H
ClaimedBy	I

Functional Dependencies:

- A → B, C, D, E, F, G, H, I
- B, C, G → A *(a user reporting an item with the same title on the same day likely identifies the item)*

Candidate Key(s):

- A (ItemID — surrogate primary key)
- (B, C, G) *(UserID + Title + DateReported — assumed uniqueness)*

Normalization:

- 1NF: Yes — all attributes are atomic
- 2NF: Yes — A is a full key, all attributes fully depend on it; and (B, C, G) is also a full key therefore, no partial dependencies
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- 3NF: Yes — all non-prime attributes depend only on candidate keys, so no transitive dependency
- BCNF: Yes — all determinants (A, and B, C, G) are candidate keys

CLAIMS

Attribute	Symbol
ClaimID	A
ItemID (FK)	B
UserID (FK)	C
ClaimDetails	D
ClaimStatus	E
CreatedAt	F

Functional Dependencies:

- A → B, C, D, E, F
- B, C → A *(a user can only claim the same item once)*

Candidate Key(s):

- A (ClaimID — surrogate primary key)
- B, C (a user can only claim the same item once so it is a candidate key)

Normalization:

- 1NF: Yes
- 2NF: Yes — A is the PK, all attributes fully depend on A
- 3NF: Yes — no transitive dependencies
- BCNF: Yes — both A and (B, C) are candidate keys

NOTIFICATIONS

Attribute	Symbol
NotificationID	A
UserID (FK)	B
ItemID (FK)	C
Message	D
CreatedAt	E

Functional Dependencies:

- A → B, C, D, E

Candidate Key(s):

- A (NotificationID — surrogate primary key)

Normalization:

- 1NF: Yes
- 2NF: Yes
- 3NF: Yes
- BCNF: Yes — A is the only determinant and a candidate key

FLAGS

Symbol	Attribute
A	FlagID
B	ItemID (FK)
C	ReportedBy

D	Status
E	CreatedAt

Functional Dependencies:

- A → B, C, D, E
- B, C → A *(a user reports an item only once)*

Candidate Key(s):

- A (FlagID — surrogate primary key)
- B, C (a user reports only once so it is a candidate key)

Normalization:

- 1NF: Yes
- 2NF: Yes
- 3NF: Yes
- BCNF: Yes — both A and (B, C) are candidate keys

COMMUNITY VERIFICATION

Attribute	Symbol
VerificationID	A
ClaimID (FK)	B
UserID (FK)	C
VoteType	D
CreatedAt	E

Functional Dependencies:

- A → B, C, D, E
- B, C → D, E *(enforced by UNIQUE(ClaimID, UserID))*

Candidate Key(s):

- A (VerificationID — surrogate primary key)
- (B, C) *(enforced via UNIQUE(ClaimID, UserID))*

Normalization:

1NF: Yes — all attributes are atomic

2NF: Yes — PK is A, all non-prime attributes fully dependent on A

3NF: Yes — no transitive dependency (B, C → D, E is fine because B, C is a candidate key)

BCNF: Yes — every determinant (A and B, C) is a candidate key

MESSAGES

Attribute	Symbol
MessageID	A
SenderID	B
ReceiverID	C
PostID	D
MessageText	E
CreatedAt	F

Functional Dependencies:

- A → B, C, D, E, F

Candidate Key(s):

- A (MessageID — surrogate primary key)

Normalization:

- 1NF: Yes
- 2NF: Yes
- 3NF: Yes
- BCNF: Yes — A is the only determinant and a candidate key