## **1. Relational Schema**

|  |  |
| --- | --- |
| R01 | User(id\_user, username **UK NN**, password **NN**, email **UNIQUE NN**, bioDescription, birthdate **NN**, profilePhoto **DF** defaultPhoto, banned **NN**, deleted **NN**, points **NN** **CK** points >=0, id\_rank->Rank **NN**, id\_role->Role **NN**) |
| R02 | Follow(follower->User, following->User) |
| R03 | Role(id\_role, type **NN DF** member **CK** type **IN** RoleType, beginningDate, endDate **CK** endDate > beginningDate) |
| R04 | Rank(id\_rank,name **UK DF** rookie **CK** name **IN** RankType , minValue **CK** minValue >= 0, maxValue **CK** maxValue > 0 && maxValue > minValue) |
| R05 | Notification(id\_notification, description **NN**, type **NN CK** type **IN** NotificationType, view **NN**,date **NN**,user>User) |
| R06 | Question(id\_question->Category,name **NN,** title **NN**, description, date **NN DF** Today, votes **NN DF** 0, photo, deleted **NN**, id\_user->User **NN**) |
| R07 | VoteQuestion(username->User, id\_question->Question) |
| R08 | Answer(id\_answer, text **NN**, date **NN DF** Today **CK** Questions.date < date, votes **NN DF** 0, photo, deleted **NN**, id\_question->Question **NN**, user\_post->User **NN**) |
| R09 | VoteAnswer(username->User,id\_answer->Answer) |
| R10 | Comment(firstAnswer->Answer, secondAnswer->Answer) |
| R11 | BestAnswer(id\_bestAnswer->Answer, active **NN**, attributionDate **NN** **CK** Answer.date < attributionDate, text **NN**, date **NN DF** Today **CK** Questions.date < date, votes **NN DF** 0, photo, deleted **NN**) |
| R12 | Faq(id\_faq, question **NN**, answer **NN**) |
| R13 | Report(id\_report, date **NN CK** Questions.date < date, reason **NN**, id\_question->Question, id\_answer->Answer) |
| R14 | UserReport(username->User,id\_report->Report) |
| R15 | Category( id\_category,name **UK NN**) |

where UK means UNIQUE KEY, NN means NOT NULL, DF means DEFAULT and CK means CHECK.

## **2. Domains**

|  |  |
| --- | --- |
| Today | DATE DEFAULT CURRENT\_DATE |
| defaultPhoto | String DEFAULT defaultPhoto.png |
| NotificationType | Enum(‘question’,’answer’,’comment’,’follow’,’vote’) |
| RankType | Enum(‘rookie’,’beginner’,’intermediate’,’enthusiast’,’advanced’,’veteran’) |
| RoleType | Enum(‘member’,’moderator’,’administrator’) |

## **3. Functional Dependencies and schema validation**

R01 (User)

Keys :{id\_user},{username},{username,email}

FD:

{id\_user} → {username, password, email, bioDescription, birthdate, profilePhoto, banned, deleted, points, id\_rank, id\_role}

{username} → {id\_user}

{username,email} → {id\_user}

{points} → {id\_rank}

{banned} → {deleted}

Normal Form:

Not in BCNF, decomposition:

User1(id\_user, username, password, email, bioDescription, birthdate, profilePhoto, banned, points, id\_role)

User2(points,id\_rank)

User3(banned,deleted)

R02(Follow)

Keys:{follower},{following}

FD: (none)

Normal Form: BCNF

R03(Role)

Keys:{id\_role}

FD:

{id\_role} → {type,beginningDate,endDate}

Normal Form: BCNF

R04(Rank)

Keys:{id\_rank},{name}

FD:

{id\_rank} → {name,minValue,maxValue}

{name} → {id\_rank}

Normal Form:BCNF

R05(Notification)

Keys:{id\_notification}

FD:

{id\_notification} → {description,type,view,author}

Normal Form:BCNF

R06(Question)

Keys:{id\_question},{id\_user,title,description,photo,deleted}

FD:

{id\_question} → {title,description,date,votes,photo,deleted,id\_user,name}

{id\_user,title,description,photo,deleted} → {id\_question}

Normal Form:BCNF

R07(VoteQuestion)

Keys:{username},{id\_answer}

FD:

(none)

Normal Form: BCNF

R08(Answer)

Keys:{id\_answer},{text,id\_question,username,photo,deleted}

FD:

{id\_answer} → {text, id\_question, date, votes, photo, deleted, username}

{text,id\_question,username,photo,deleted} → {id\_answer}

Normal Form:BCNF

R09(VoteAnswer)

Keys:{username},{id\_answer}

FD:

(none)

Normal Form: BCNF

R10(Comment)

Keys:{firstAnswer},{secondAnswer}

FD:

(none)

Normal Form:BCNF

R11(BestAnswer)

Keys:{id\_bestAnswer}

FD:

{id\_bestAnswer} → {active,attributionDate,text,date,votes,photo,deleted}

{deleted} → {active}

Normal Form:

Not in BCNF, decomposition:

BestAnswer1(id\_bestAnswer, attributionDate, text, date, votes, photo, deleted)

BestAnswer2(deleted,active)

R12(Faq)

Keys:{id\_faq},{question},{answer}

FD:

{id\_faq} → {question,answer}

{question} → {id\_faq}

{answer} → {id\_faq}

Normal Form:BCNF

R13(Report)

Keys:{id\_report}

FD:

{id\_report} → {date,reason,id\_question,id\_answer}

Normal Form:BCNF

R14(UserReport)

Keys:{username},{id\_report}

FD:

(none)

Normal Form: BCNF

R15(Category)

Keys:{id\_category},{name}

FD:

{id\_category} → {name}

{name} → {id\_category}

Normal Form: BCNF

## **4. SQL Code**

CREATE TABLE public."User1" (

id\_user integer NOT NULL,

username text NOT NULL,

password text NOT NULL,

email text NOT NULL,

"bioDescription" text,

birthdate date NOT NULL,

"profilePhoto" text DEFAULT defaultPhoto,

banned boolean NOT NULL,

points integer NOT NULL,

id\_role integer NOT NULL

);

CREATE TABLE public."User2" (

points integer NOT NULL,

id\_rank integer NOT NULL

);

CREATE TABLE public."User3" (

banned boolean NOT NULL,

deleted boolean NOT NULL

);