

## **yellowPinkPenguin mobile app Database Implementation**

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## System Description

yellowPinkPenguin mobile app has decided to do monetization and establish its own advertising ecosystem. Hence there is a need to create a comprehensive database to support this initiative and manage all its components efficiently.

For every yellowPinkPenguin user, the system intends to collect and store the following user details: *User ID, full name (including first name and last name), phone number, email address, date of birth, account location, up to ten interests*. Users have the capability to follow other users on the platform, as well as to create and administer multiple ad accounts. For users who administer ad accounts, the system should keep track of their access levels.

Ad Accounts serve for users to promote their products or services through advertising campaigns. They can be administered by multiple users, but should always have at least one admin user. The following information will be recorded for each Ad Account: *Account ID, address details (street, city, country, postal code), account creation date, and current status*.

Every Ad Account is associated with only one Billing Account. Billing Account can be linked to only one Ad Account. The database will store the following Billing Account details: *Billing Account ID, payment method information, billing address (street, city, country, postal code), optional company name, full name of the account holder (first name and last name), phone number (up to 3), and email address (up to 3), creation date and status*. Any platform user can manage a Billing Account, and the system will track the access level of each authorised user.

Every transaction generated by a billing account has to be tracked. Each transaction will include: *Transaction Number, Transaction Date, Transaction Amount and Description*.

The system will also capture information related to Ad Campaigns. This includes *Campaign ID, allocated budget, targeted countries (up to 195), marketing objectives, bid strategy, campaign start date, campaign end date, total budget, and current status*.

Ad Accounts can have many Ad Campaigns, and Ad Campaigns can have many ads.

Ads to be tracked. Each Ad will be assigned a unique *Ad ID* and will have associated attributes such as *creation date, status, title, and the final URL*. Ads can be Text, Image or Video. For Text ads, the system will store the body text, while for Image ads, it will track the image ID, and for Video ads, it will record the video ID.

Furthermore, yellowPinkPenguin intends to record ad impressions and clicks whenever a user views and interacts with an ad.

The database will also maintain records of Publishers who offer ad space on their platforms, which may include websites and apps. Publisher information will encompass *publisher ID, platform type, name, start date and status*. In cases where ads appear on partner platforms, the system will track impressions, clicks, and the date of the interaction.

### Entity types:

Strong Entity Types: User, Billing Account, Ad Account, Ad Campaign, Ad, Publishers

Weak entity Types: Transactions

### Relationship types:

User 1..*	administers	0..* Ad Account
User 1..*	manages	0..* Billing Account
Billing Account 1..1	funds	1..1 Ad Account
Billing Account 1..1	generates	0..* Transaction
Ad Account 1..1	controls	0..* Ad Campaign
Ad Campaign 1..1	runs	0..* Ad
Ad 0..*	targets	0..* User
Publisher 0..*	hosts	0..* Ad

### Entity type attributes:

User: userID, name (firstName, lastName), phoneNumber, emailAddress, dateOfBirth, accountLocation, interests

Ad Account: adAccountID, address (street, city, country, postalCode), creationDate, status

Billing Account: billingAccountID, paymentMethod, billingAddress (street, city, country, postalCode), companyName, name (firstName, lastName), phoneNumber, email, creation date, status

Transaction: transactionNumber, transactionDate, transactionAmount, description

Ad Campaign: campaignID, budget, targetedCountries, marketingObjective, bidStrategy, startDate, endDate, status

Ad: adID, creationDate, status, title, finalURL

- Text: bodyText

- Image: imageID
- Video: videoID

Publisher: publisherID, platformType, name, startDate, status

**Relationship type attributes:**

- There is a requirement to track User access level to Ad Account and Billing Account.
- There is a requirement to track ad impressions and clicks whenever a user views and interacts with an ad.
- There is also a requirement to track impressions, clicks, and the date of the interaction with an ad on a publisher platform.

**Candidate, primary and alternative key attributes**

User: Candidate keys: userID, name and dateOfBirth, emailAddress, phoneNumber  
Primary key: userID

Ad Account: Candidate keys: adAccountID  
Primary key: adAccountID

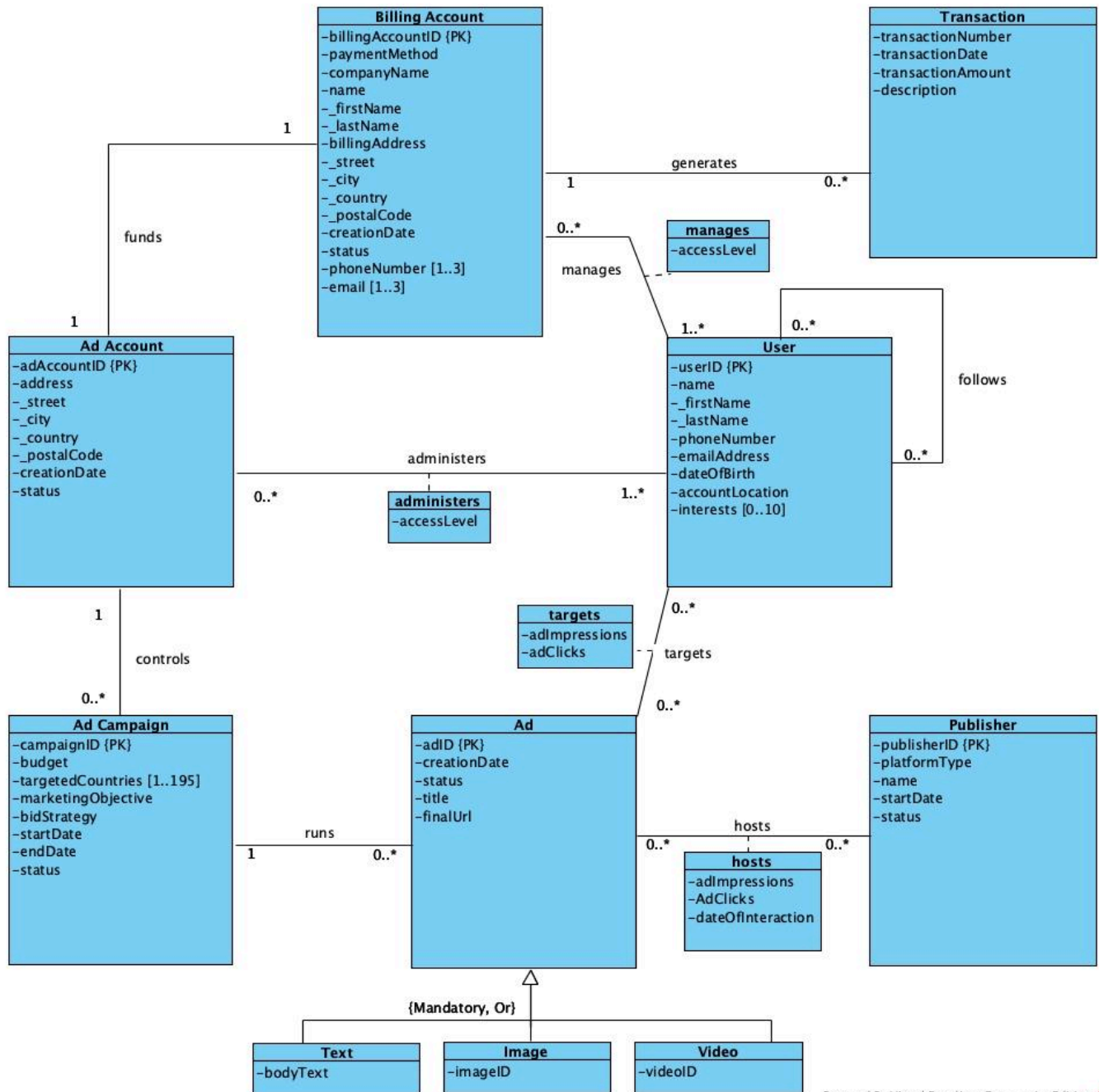
Billing Account: Candidate keys: billingAccountID, companyName and name  
Primary key: billingAccountID

Ad Campaign: Candidate keys: campaignID  
Primary key: campaignID

Ad: Candidate keys: adID  
Primary key: adID

Publisher: Candidate keys: publisherID, name and startDate  
Primary key: publisherID

## Enhanced ER diagram:



## Logical Data Model

### *Full Set of Tables:*

User (userID, firstName, lastName, phoneNumber, emailAddress, dateOfBirth, accountLocation)

Primary key userID

UserInterests (interests, userID)

Primary key interests, userID

Foreign Key userID references User (userID)

administers(userID, adAccountID, accessLevel)

Primary key userID, adAccountID

Foreign key userID references User (userID)

Foreign key adAccountID references Ad Account (adAccountID)

manages(userID, billingAccountID, accessLevel)

Primary key userID, billingAccountID

Foreign key userID references User (userID)

Foreign key billingAccountID references Billing Account (billingAccountID)

follows (userID, followerID)

Primary key userID, followerID

Foreign key userID references User (userID)

Foreign key followerID references User (userID)

Ad Account (adAccountID, street, city, country, postal code, creationDate, status, billingAccountID)

Primary key adAccountID

Foreign key billingAccountID references Billing Account (billingAccountID)

Billing Account (billingAccountID, paymentMethod, street, city, country, postalCode, companyName, firstName, lastName, creation date, status)

Primary key billingAccountID

BillingAccPhones (phoneNumber, billingAccountID)

Primary key phoneNumber, billingAccountID

Foreign key billingAccountID references Billing Account (billingAccountID)

BillingAccEmails (email, billingAccountID)

Primary key email, billingAccountID

Foreign key billingAccountID references Billing Account (billingAccountID)

Transaction (transactionNumber, transactionDate, transactionAmount, description, billingAccountID)

Primary key transactionNumber, billingAccountID

Foreign key billingAccountID references Billing Account (billingAccountID)

Ad Campaign (campaignID, budget, marketingObjective, bidStrategy, startDate, endDate, status, adAccountID)

Primary key campaignID

Foreign key adAccountID references Ad Account (adAccountID)

AdCampaignTargetedCountries (targetedCountries, campaignID)

Primary key targetedCountries, campaignID

Foreign key campaignID references Ad Campaign (campaignID)

Ad (adID, creationDate, status, title, finalURL, type, bodyText, imageID, videoID, campaignID)

Primary key adID

Foreign key campaignID references Ad Campaign (campaignID)

targets (adID, userID, adImpressions, adClicks)

Primary key adID, userID

Foreign key adID references Ad (adID)

Foreign key userID references User (userID)

Publisher (publisherID, platformType, name, startDate, status)

Primary key publisherID

hosts (publisherID, adID, adImpressions, adClicks, dateOfInteraction)

Primary key publisherID, adID, dateOfInteraction

Foreign key publisherID references Publisher (publisherID)

Foreign key adID references Ad (adID)