# Q1. Email System
## Entities, Attributes, and Relationships

## 1. User

- `UserID` (PK)
- `FirstName`
- `LastName`
- `EmailAddress`
- **Discriminator**: `UserType` (values: "trial", "paying")

## Subtypes (Generalization - Specialization):

- **TrialUser** (inherits from `User`):
  - `ExpirationDate`
  - `RemainingQuota`

- **PayingCustomer** (inherits from `User`):
  - `Balance`

## 2. Contact

- `ContactID` (PK)
- `FirstName`
- `LastName`
- `EmailAddress`

## Relationship: `HasContacts`

- (1:N) from `User` → `Contact` (each user can have multiple contacts)

## 3. PhoneNumber (Weak Entity)

- `PhoneID` (PK)
- `Number`
- `Type` (e.g., "home", "work", "cell")
- **FK**: `ContactID`

## Relationship: `HasPhoneNumbers`

- (1:N) from `Contact` → `PhoneNumber`
- `PhoneNumber` is **existence-dependent** on `Contact` (weak entity)

## 4. Folder

- `FolderID` (PK)
- `Name`
- `ParentFolderID` (nullable, self-referencing FK)

## Relationship: `BelongsToUser`

- (1:N) from `User` → `Folder`
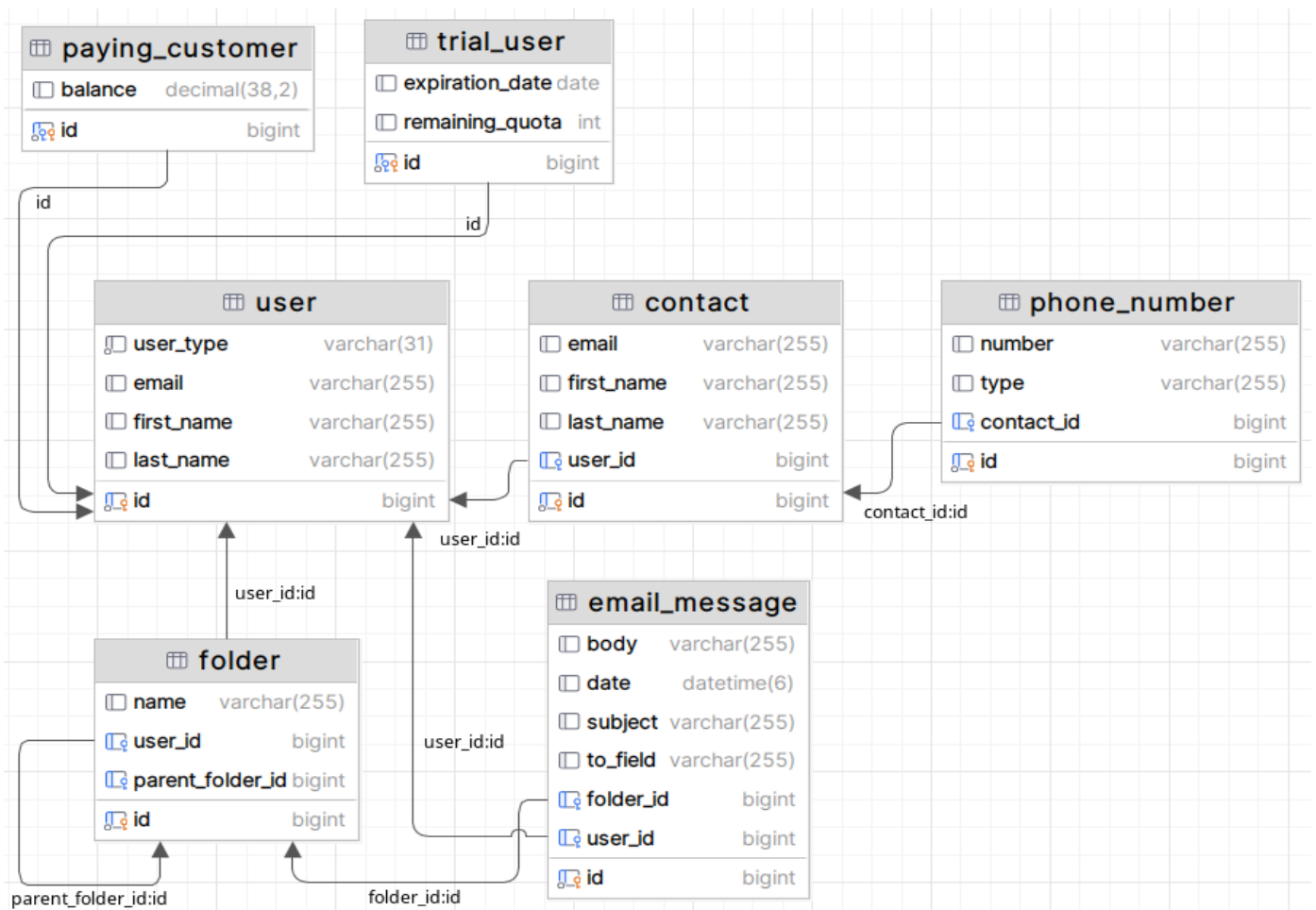- (0:1) recursive relationship: A folder may have a `ParentFolder`

## 5. EmailMessage

- `MessageID` (PK)
- To (email address or list)
- `Date`
- `Subject`
- `Body`

## Relationships:

- `BelongsToUser`: (M:1) → Email belongs to 1 user (sender)
- `StoredIn`: (M:1) → Email stored in 1 folder

# ER Diagram: Email System Schema

# Q2. College Student Monitoring System
## Entities, Attributes, and Relationships
## 1. Student

- `StudentID` (PK)
- `FirstName`
- `LastName`
- `Address`

## Relationship: `StudiesFor`

- (M:1) → `Degree`

## 2. Degree

- `DegreeID` (PK)
- Name (e.g., "Computer Engineering")
- Type (e.g., "BA", "M.Sc.")

## Relationship: `HasCompulsoryModules`

- (M:N) → with `Module` (via associative entity `CompulsoryModule`)

## 3. Module

- `ModuleCode` (PK)
- `Title`
- `CreditValue`

## Recursive Relationship: `HasPrerequisite`

- (M:N) from `Module` to `Module`

## Relationships:

- `LedBy` (1:1) → each Module has one `ModuleLeader`
- `TaughtBy` (M:N) → with `Lecturer` (via associative entity `Teaches`)

## 4. Lecturer

- `LecturerID` (PK)
- `Name`
- `Department`

## Relationships:

- `Teaches`: (M:N) → `Module`
- `Leads`: (1:1) → `Module`

# 5. Enrollment (Associative Entity)

- Composite PK: (StudentID, ModuleCode)
- Grade
- ExamResult

## Relationships:

- M:N between Student and Module, enriched with exam data

# ER Diagram: Student Monitoring System Schema