Implementazione SQL

```sql
CREATE TABLE Tratta (
        id INT UNSIGNED NOT NULL AUTO_INCREMENT,
        costo DECIMAL UNSIGNED NOT NULL,
        PRIMARY KEY (id)
) ENGINE = INNODB;

CREATE TABLE Tratta_urbano (
        citta VARCHAR(50) NOT NULL,
        id_tratta INT UNSIGNED NOT NULL,
        PRIMARY KEY (id_tratta),
        FOREIGN KEY (id_tratta)
                REFERENCES Tratta(id)
                ON DELETE CASCADE
                ON UPDATE CASCADE
) ENGINE = INNODB;

CREATE TABLE Tratta_extraurbano (
        da_km SMALLINT UNSIGNED NOT NULL,
        a_km SMALLINT UNSIGNED NOT NULL,
        id_tratta INT UNSIGNED NOT NULL,
        PRIMARY KEY (id_tratta),
        FOREIGN KEY (id_tratta)
                REFERENCES Tratta(id)
                ON DELETE CASCADE
                ON UPDATE CASCADE
) ENGINE = INNODB;

CREATE TABLE Tratta_metro (
        da_zona TINYINT UNSIGNED NOT NULL,
        a_zona TINYINT UNSIGNED NOT NULL,
        id_tratta INT UNSIGNED NOT NULL,
        PRIMARY KEY (id_tratta),
        FOREIGN KEY (id_tratta)
                REFERENCES Tratta(id)
                ON DELETE CASCADE
                ON UPDATE CASCADE
) ENGINE = INNODB;
```

```sql
CREATE TABLE Tratta_treno (
        da VARCHAR(50) NOT NULL,
        a VARCHAR(50) NOT NULL,
        id_tratta INT UNSIGNED NOT NULL,
        PRIMARY KEY (id_tratta),
        FOREIGN KEY (id_tratta)
                REFERENCES Tratta(id)
                ON DELETE CASCADE
                ON UPDATE CASCADE
) ENGINE = INNODB;

CREATE TABLE Tratta_tram (
        citta VARCHAR(50) NOT NULL,
        id_tratta INT UNSIGNED NOT NULL,
        PRIMARY KEY (id_tratta),
        FOREIGN KEY (id_tratta)
                REFERENCES Tratta(id)
                ON DELETE CASCADE
                ON UPDATE CASCADE
) ENGINE = INNODB;

CREATE TABLE Tratta_traghetto (
        da VARCHAR(50) NOT NULL,
        a VARCHAR(50) NOT NULL,
        id_tratta INT UNSIGNED NOT NULL,
        PRIMARY KEY (id_tratta),
        FOREIGN KEY (id_tratta)
                REFERENCES Tratta(id)
                ON DELETE CASCADE
                ON UPDATE CASCADE
) ENGINE = INNODB;

CREATE TABLE Carta_trasporto (
        numero_carta VARCHAR(16) NOT NULL,
        saldo DECIMAL NOT NULL,
        data_rilascio DATE NOT NULL,
        id_proprietario INT UNSIGNED NOT NULL,
        PRIMARY KEY (numero_carta),
        FOREIGN KEY (id_proprietario)
                REFERENCES Cliente(id)
                ON DELETE CASCADE
                ON UPDATE CASCADE
) ENGINE = INNODB;
```

```sql
CREATE TABLE Transazione (
        id INT UNSIGNED NOT NULL AUTO_INCREMENT,
        timestamp TIMESTAMP NOT NULL,
        tipo ENUM("in", "out") NOT NULL,
        id_tratta INT UNSIGNED NOT NULL,
        numero_lettore VARCHAR(25) NOT NULL,
        numero_carta VARCHAR(16) NOT NULL,
        PRIMARY KEY (id),
        FOREIGN KEY (id_tratta)
                REFERENCES Tratta(id)
                ON DELETE CASCADE
                ON UPDATE CASCADE,
        FOREIGN KEY (numero_lettore)
                REFERENCES LettoreNFC(numero_serie)
                ON DELETE CASCADE
                ON UPDATE CASCADE,
        FOREIGN KEY (numero_carta)
                REFERENCES Carta_trasporto(numero_carta)
                ON DELETE CASCADE
                ON UPDATE CASCADE
) ENGINE = INNODB;

CREATE TABLE Presenza (
        id INT UNSIGNED NOT NULL AUTO_INCREMENT,
        timestamp TIMESTAMP NOT NULL,
        tipo ENUM("in", "out") NOT NULL,
        id_autista INT UNSIGNED NOT NULL,
        numero_lettore VARCHAR(25) NOT NULL,
        PRIMARY KEY (id),
        FOREIGN KEY (id_autista)
                REFERENCES Autista(id)
                ON DELETE CASCADE
                ON UPDATE CASCADE,
        FOREIGN KEY (numero_lettore)
                REFERENCES LettoreNFC(numero_serie)
                ON DELETE CASCADE
                ON UPDATE CASCADE
) ENGINE = INNODB;


CREATE TABLE LettoreNFC (
        numero_serie VARCHAR(25) NOT NULL,
        data_installazione DATE NOT NULL,
        transazioni_effettuate INT UNSIGNED NOT NULL,
        PRIMARY KEY (numero_serie)
) ENGINE = INNODB;
```

```sql
CREATE TABLE Autista (
        id INT UNSIGNED NOT NULL AUTO_INCREMENT,
        nome VARCHAR(25) NOT NULL,
        cognome VARCHAR(25) NOT NULL,
        data_nascita DATE NOT NULL,
        iban VARCHAR(34) NOT NULL,
        email VARCHAR(254) NOT NULL,
        numero_documento VARCHAR(9) NOT NULL UNIQUE,
        id_indirizzo INT UNSIGNED NOT NULL,
        PRIMARY KEY (id),
        FOREIGN KEY (id_indirizzo)
                REFERENCES Indirizzo(id)
                ON DELETE CASCADE
                ON UPDATE CASCADE
) ENGINE = INNODB;

CREATE TABLE Cliente (
        id INT UNSIGNED NOT NULL AUTO_INCREMENT,
        nome VARCHAR(25) NOT NULL,
        cognome VARCHAR(25) NOT NULL,
        email VARCHAR(254) NOT NULL UNIQUE,
        password VARCHAR(32) NOT NULL,
        numero_documento VARCHAR(9) NOT NULL UNIQUE,
        id_indirizzo INT UNSIGNED NOT NULL,
        PRIMARY KEY (id),
        FOREIGN KEY (id_indirizzo)
                REFERENCES Indirizzo(id)
                ON DELETE CASCADE
                ON UPDATE CASCADE
) ENGINE = INNODB;

CREATE TABLE Indirizzo(
        id INT UNSIGNED NOT NULL AUTO_INCREMENT,
        via VARCHAR(25) NOT NULL,
        provincia VARCHAR(25) NOT NULL,
        citta VARCHAR(25) NOT NULL,
        cap VARCHAR(5) NOT NULL,
        PRIMARY KEY(id)
) ENGINE = INNODB;
```

```sql
CREATE TABLE Metodo_pagamento (
        id INT UNSIGNED NOT NULL AUTO_INCREMENT,
        tipo_carta ENUM("visa", "mastercard", "postepay", "maestro", "american_express") NOT NULL,
        numero_carta VARCHAR(16) NOT NULL UNIQUE,
        nome_titolare VARCHAR(25) NOT NULL,
        data_scadenza DATE NOT NULL,
        id_indirizzo INT UNSIGNED NOT NULL,
        id_cliente INT UNSIGNED NOT NULL,
        PRIMARY KEY (id),
        FOREIGN KEY (id_indirizzo)
                REFERENCES Indirizzo(id)
                ON DELETE CASCADE
                ON UPDATE CASCADE,
        FOREIGN KEY (id_cliente)
                REFERENCES Cliente(id)
                ON DELETE CASCADE
                ON UPDATE CASCADE
) ENGINE = INNODB;
```