Datenbankpraktikum 2020

Abgabe Aufgabe 1

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1 Relationenmodell

Bei der Angabe der Relationen verzichteten wir aus Übersichtlichkeitsgründen auf die Angabe der Datentypen sowie auf die referenzierten Tabellen. Diese Informationen können aus dem DDL-Skript oder unter Punkt 2 dieses Dokumentes nachgelesen werden.

Legende:

- `primary key`
- `foreign key`
- `foreign as primary key`

Tabellen:

- *Tag* (`id`, name, url);
- *TagClass* (`id`, name, url);
- *Continent* (`id`, name, url);
- *Country* (`id`, name, `continent_id`, url);
- *City* (`id`, name, `country_id`, url);
- *Person* (`id`, creationDate, firstName, lastName, gender, birthday, email, speaks, browserUsed, locationIP, `city_id`);
- *Company* (`id`, name, url, `country_id`);
- *University* (`id`, name, url, `city_id`);
- *Forum* (`id`, title, creationDate, moderator);
- *Post* (`id`, language, imageFile, creationDate, browserUsed, locationIP, content, length, `forum_id`, `author_id`, `country_id`);
- *Comment* (`id`, creationDate, browserUsed, locationIP, content, length, `author_id`, `country_id`, `reply_to_post_id`, `reply_to_comment_id`);
- *Forum_hasMember_Person* (`person_id`, `forum_id`, joinDate);
- *Forum_hasTag_Tag* (`forum_id`, `tag_id`);
- *Tag_hasType_TagClass* (`tag_id`, `tagClass_id`);
- *TagClass_isSubclassOf_TagClass* (`tag_parent_id`, `tag_child_id`);
- *Post_hasTag_Tag* (`post_id`, `tag_id`);

- *Comment_hasTag_Tag* (<u>`comment_id`</u>, <u>`tag_id`</u>);
- *Person_knows_Person* (<u>`person_1_id`</u>, <u>`person_2_id`</u>, creationDate);
- *Person_studyAt_University* (<u>`person_id`</u>, <u>`university_id`</u>, classYear);
- *Person_workAt_Company* (<u>`person_id`</u>, <u>`company_id`</u>, workFrom);
- *Person_likes_Post* (<u>`person_id`</u>, <u>`post_id`</u>, creationDate);
- *Person_likes_Comment* (<u>`person_id`</u>, <u>`comment_id`</u>, creationDate);
- *Person_hasInterest_Tag* (<u>`person_id`</u>, <u>`tag_id`</u>);

2 Tabellen (SQL) incl. Constraints

```sql
CREATE FUNCTION valid_email(b boolean, v VARCHAR)
    RETURNS boolean
    AS $$
    SELECT $2 ~ '^[\w\.-]+@[\w+\.-]+\.[\w]{2,4}$' as result $$
    LANGUAGE sql;


CREATE OPERATOR =%= (
    PROCEDURE = valid_email,
    LEFTARG = boolean,
    RIGHTARG = varchar
);


CREATE TABLE tag(
    id BIGSERIAL PRIMARY KEY,
    name VARCHAR(150) NOT NULL,
    url TEXT
);


CREATE TABLE tagclass(
    id BIGSERIAL PRIMARY KEY,
    name VARCHAR(150) NOT NULL,
    url TEXT
);


CREATE TABLE continent(
    id BIGSERIAL PRIMARY KEY,
    name VARCHAR(100) NOT NULL,
    url TEXT
);


CREATE TABLE country(
    id BIGSERIAL PRIMARY KEY,
    name VARCHAR(100) NOT NULL,
    continent_id BIGINT NOT NULL REFERENCES continent(id) ON DELETE
       CASCADE ON UPDATE CASCADE,
    url TEXT
);


CREATE TABLE city(
    id BIGSERIAL PRIMARY KEY,
    name VARCHAR(100) NOT NULL,
    country_id BIGINT NOT NULL REFERENCES country(id) ON DELETE CASCADE
        ON UPDATE CASCADE,
    url TEXT
);


CREATE TABLE person(
    id BIGSERIAL PRIMARY KEY,
    creationDate TIMESTAMP NOT NULL,
    firstName VARCHAR(50) NOT NULL,
    lastName VARCHAR(100) NOT NULL,
    gender VARCHAR(7) NOT NULL,
    birthday Date NOT NULL,
    email VARCHAR[], -- ArrayType bc [1..*]
    speaks VARCHAR[] NOT NULL, -- ArrayType bc [1..*]
    browserUsed VARCHAR(50) NOT NULL,
    locationIP VARCHAR(40) NOT NULL,
    city_id BIGINT NOT NULL REFERENCES city(id) ON DELETE CASCADE ON
       UPDATE CASCADE,

    CONSTRAINT birthday_not_in_future CHECK (birthday <= NOW()::DATE),
    CONSTRAINT vaild_email CHECK (TRUE =%= ALL(email))
);


CREATE TABLE company(
    id BIGSERIAL PRIMARY KEY,
    name VARCHAR(200) NOT NULL,
    url TEXT,
    country_id BIGINT NOT NULL REFERENCES country(id) ON DELETE CASCADE
        ON UPDATE CASCADE
```

```sql
);


CREATE TABLE university(
    id BIGSERIAL PRIMARY KEY,
    name VARCHAR(200) NOT NULL,
    url TEXT,
    city_id BIGINT NOT NULL REFERENCES city(id) ON DELETE CASCADE ON
       UPDATE CASCADE
);


CREATE TABLE forum(
    id BIGSERIAL PRIMARY KEY,
    title VARCHAR(200) NOT NULL,
    creationDate TIMESTAMP NOT NULL,
    moderator BIGINT NOT NULL REFERENCES person(id) ON DELETE CASCADE
       ON UPDATE CASCADE
);


CREATE TABLE post(
    id BIGSERIAL PRIMARY KEY,
    language VARCHAR(2), -- Achtung, hier soll Null erlaubt sein
    imageFile VARCHAR(150), -- Achtung, hier soll Null erlaubt sein
    creationDate TIMESTAMP NOT NULL,
    browserUsed VARCHAR(50) NOT NULL,
    locationIP VARCHAR(40) NOT NULL,
    content TEXT, -- Achtung, hier soll Null erlaubt sein
    length INT NOT NULL,
    forum_id BIGINT NOT NULL REFERENCES forum(id) ON DELETE CASCADE ON
       UPDATE CASCADE,
    author_id BIGINT REFERENCES person(id) ON DELETE SET NULL ON UPDATE
        CASCADE,
    country_id BIGINT NOT NULL REFERENCES country(id) ON DELETE CASCADE
        ON UPDATE CASCADE
);


CREATE TABLE comment(
    id BIGSERIAL PRIMARY KEY,
    creationDate TIMESTAMP NOT NULL,
    browserUsed VARCHAR(50) NOT NULL,
    locationIP VARCHAR(40) NOT NULL,
    content TEXT, -- Achtung, hier soll Null erlaubt sein
    length INT NOT NULL,
    author_id BIGINT REFERENCES person(id) ON DELETE SET NULL ON UPDATE
        CASCADE,
    country_id BIGINT NOT NULL REFERENCES country(id) ON DELETE CASCADE
```

```
        ON UPDATE CASCADE,
    reply_to_post_id BIGINT REFERENCES post(id) ON DELETE SET NULL ON
       UPDATE CASCADE,
    reply_to_comment_id BIGINT REFERENCES comment(id) ON DELETE SET
       NULL ON UPDATE CASCADE,

    CONSTRAINT belongs_to_message_or_post CHECK (((reply_to_comment_id
       IS NOT NULL) AND (reply_to_post_id IS NULL)) OR ((
       reply_to_comment_id IS NULL) AND (reply_to_post_id IS NOT NULL))
       )
);


CREATE TABLE forum_hasMember_person(
    person_id BIGINT NOT NULL REFERENCES person(id) ON DELETE CASCADE
       ON UPDATE CASCADE,
    forum_id BIGINT NOT NULL REFERENCES forum(id) ON DELETE CASCADE ON
       UPDATE CASCADE,
    joinDate TIMESTAMP NOT NULL,
    PRIMARY KEY (person_id, forum_id)
);


CREATE TABLE forum_hasTag_tag(
    forum_id BIGINT NOT NULL REFERENCES forum(id) ON DELETE CASCADE ON
       UPDATE CASCADE,
    tag_id BIGINT NOT NULL REFERENCES tag(id) ON DELETE CASCADE ON
       UPDATE CASCADE,
    PRIMARY KEY (forum_id, tag_id)
);


CREATE TABLE tag_hasType_tagclass(
    tag_id BIGINT NOT NULL REFERENCES tag(id) ON DELETE CASCADE ON
       UPDATE CASCADE,
    tagclass_id BIGINT NOT NULL REFERENCES tagclass(id) ON DELETE
       CASCADE ON UPDATE CASCADE,
    PRIMARY KEY (tag_id, tagclass_id)
);


CREATE TABLE tagclass_isSubclassOf_tagclass(
    tag_parent_id BIGINT NOT NULL REFERENCES tag(id) ON DELETE CASCADE
       ON UPDATE CASCADE,
    tag_child_id BIGINT NOT NULL REFERENCES tag(id) ON DELETE CASCADE
       ON UPDATE CASCADE,
    PRIMARY KEY (tag_parent_id, tag_child_id)
);
```

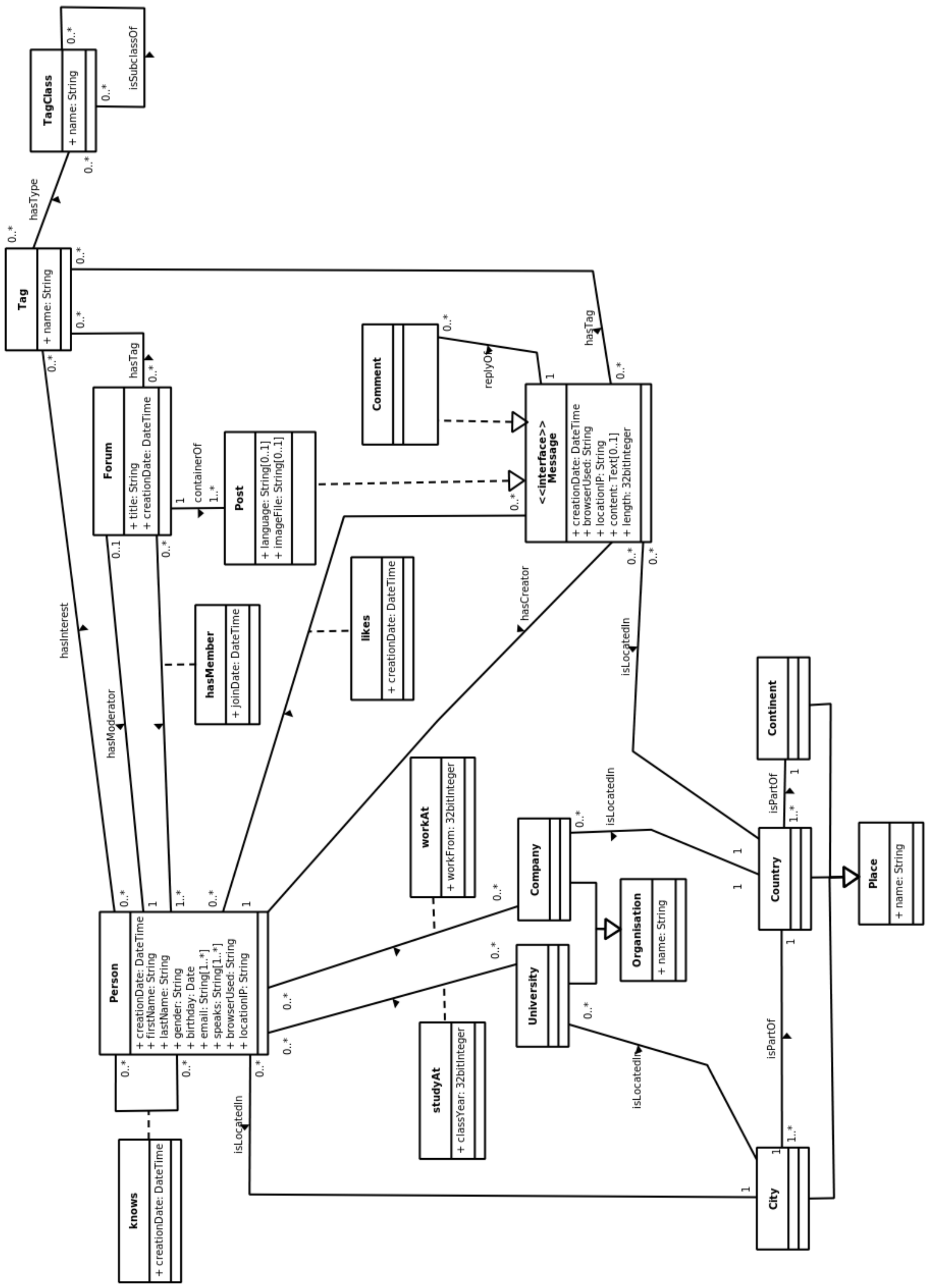
```
CREATE TABLE post_hasTag_tag(
    post_id BIGINT NOT NULL REFERENCES post(id) ON DELETE CASCADE ON
       UPDATE CASCADE,
    tag_id BIGINT NOT NULL REFERENCES tag(id) ON DELETE CASCADE ON
       UPDATE CASCADE,
    PRIMARY KEY (post_id, tag_id)
);


CREATE TABLE comment_hasTag_tag(
    comment_id BIGINT NOT NULL REFERENCES comment(id) ON DELETE CASCADE
        ON UPDATE CASCADE,
    tag_id BIGINT NOT NULL REFERENCES tag(id) ON DELETE CASCADE ON
       UPDATE CASCADE,
    PRIMARY KEY (comment_id, tag_id)
);


CREATE TABLE person_knows_person(
    person_1_id BIGINT NOT NULL REFERENCES person(id) ON DELETE CASCADE
        ON UPDATE CASCADE,
    person_2_id BIGINT NOT NULL REFERENCES person(id) ON DELETE CASCADE
        ON UPDATE CASCADE,
    creationDate TIMESTAMP NOT NULL,
    PRIMARY KEY (person_1_id, person_2_id)
);


CREATE TABLE person_studyAt_university(
    person_id BIGINT NOT NULL REFERENCES person(id) ON DELETE CASCADE
       ON UPDATE CASCADE,
    university_id BIGINT NOT NULL REFERENCES university(id) ON DELETE
       CASCADE ON UPDATE CASCADE,
    classYear INT NOT NULL,
    PRIMARY KEY (person_id, university_id)
);


CREATE TABLE person_workAt_company(
    person_id BIGINT NOT NULL REFERENCES person(id) ON DELETE CASCADE
       ON UPDATE CASCADE,
    company_id BIGINT NOT NULL REFERENCES company(id) ON DELETE CASCADE
        ON UPDATE CASCADE,
    workFrom INT NOT NULL,
    PRIMARY KEY (person_id, company_id)
);
```

```
CREATE TABLE person_likes_post(
    person_id BIGINT NOT NULL REFERENCES person(id) ON DELETE CASCADE
       ON UPDATE CASCADE,
    post_id BIGINT NOT NULL REFERENCES post(id) ON DELETE CASCADE ON
       UPDATE CASCADE,
    creationDate TIMESTAMP NOT NULL,
    PRIMARY KEY (person_id, post_id)
);


CREATE TABLE person_likes_comment(
    person_id BIGINT NOT NULL REFERENCES person(id) ON DELETE CASCADE
       ON UPDATE CASCADE,
    comment_id BIGINT NOT NULL REFERENCES comment(id) ON DELETE CASCADE
        ON UPDATE CASCADE,
    creationDate TIMESTAMP NOT NULL,
    PRIMARY KEY (person_id, comment_id)
);


CREATE TABLE person_hasInterest_Tag(
    person_id BIGINT NOT NULL REFERENCES person(id) ON DELETE CASCADE
       ON UPDATE CASCADE,
    tag_id BIGINT NOT NULL REFERENCES tag(id) ON DELETE CASCADE ON
       UPDATE CASCADE,
    PRIMARY KEY (person_id, tag_id)
);
```

3 Programm zum Einlesen der Daten

Wir haben ein Java-Tool geschrieben, was die gegebenen Daten parsed und entsprechend einliest. Dies wird am Testattermin (28.5.2020) präsentiert.
Der Source-Code ist der Abgabe beigefügt.

4 UML-Diagramm (war vorgegeben)


TagClass
+ name: String
isSubclassOf
hasType
Tag
+ name: String
hasTag
hasTag
Forum
+ title: String
+ creationDate: DateTime
containerOf
Post
+ language: String[0..1]
+ imageFile: String[0..1]
Comment
replyOf
<<interface>>
Message
+ creationDate: DateTime
+ browserUsed: String
+ locationIP: String
+ content: Text[0..1]
+ length: 32bitInteger
likes
+ creationDate: DateTime
hasMember
+ joinDate: DateTime
hasInterest
hasModerator
hasCreator
isLocatedIn
Continent
isPartOf
workAt
+ workFrom: 32bitInteger
Company
isLocatedIn
Country
Place
+ name: String
Organisation
+ name: String
University
studyAt
+ classYear: 32bitInteger
isLocatedIn
isPartOf
City
Person
+ creationDate: DateTime
+ firstName: String
+ lastName: String
+ gender: String
+ birthday: Date
+ email: String[1..*]
+ speaks: String[1..*]
+ browserUsed: String
+ locationIP: String
knows
+ creationDate: DateTime
isLocatedIn