Practical 3 - The Relational Algebra and SQL

The following relational schema of a Web forum is given:

```
Thread      (threadID, subject, userID, nickname)
Message     (messageID, subject, text, datetime,
                        threadID, userID, replyMessageID)
User        (userID, nickname, name, interests)
Group       (groupID, groupname, description)
Membership  (groupID, userID, role)
```

1. Relational schema

(a) Reverse engineering: what is the ER schema for these relations?

(b) Are there any redundancies in this schema? Do the schemata conform to normal forms 1, 2, and 3?

2. Queries

Write the following queries in Relational Algebra (alternatively SQL could be used), if possible:

1. All messages by the user "elwood"?

2. Who are the administrators of the group "zanzibar"?

3. All messages of the thread "New Neil Young album out!"?

4. All messages of the thread "New Ron Sexsmith album out!" in chronological order?

5. All threads created by users from the group called "kiddies"?

6. What are the replies to a message about "5-legged elephant for sale" (direct replies, indirect replies)?

7. Which users have never posted a message?

8. On which days in 2016 were there no messages at all?