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**Data Types****User**

Attribute	Data Type	Nullable
Email	String	Not Null
Pin	String	Not Null
Name	String	Not Null

**CorkBoard**

Attribute	Data Type	Nullable
Title	String	Not Null
Date	Date	Not Null
Time	Datetime	Not Null

**Private CorkBoard**

Attribute	Data Type	Nullable
Password	String	Not Null

**Category**

Attribute	Data Type	Nullable
Type	String	Not Null

**PushPin**

Attribute	Data Type	Nullable
URL	String	Not Null
Date	Date	Not Null
Time	Datetime	Not Null
Description	String	Not Null
Tag	List <String>	Null

**Public CorkBoard**

No attributes

## Business Logic Constraints

### CorkBoardIt User

- A User cannot follow himself or herself.
- Users cannot choose whether they want to be followed by a follower.

### CorkBoard

- Private CorkBoards need to clearly indicated in the list.
- The list of categories on Add CorkBoard cannot be changed by the user.

### Private CorkBoard

- Password is required to get access to private CorkBoards.
- Private CorkBoards cannot be watched by any user.

### Category

- Category types cannot be changed by users.

### PushPin

- Tags themselves cannot contain commas.
- Users cannot unlike a PushPin before like it.
- Users cannot like or unlike their own PushPins.
- A user cannot reply to a comment, but has to start a new comment.
- Comments cannot be deleted.
- PushPins can only added by owner of the current CorkBoard.
- PushPins on Private CorkBoard can never be searched by any user.

## Task Decomposition with Abstract Code

### Logging In

#### Task Decomp

**Lock Types:** Read-only Regular User

**Number of Locks:** Single

**Enabling Conditions:** None

**Frequency:** around 300 logins per day

**Consistency (ACID):** not critical, order is not critical.

**Subtasks:** Mother Task is not needed. No decomposition needed.



#### Abstract Code

- User enters into input fields.
- If data validation is successful for both *email* and *pin* input fields, then:
  - When **Login** button is clicked:
    - If User record is found but *pin* is incorrect:
      - Go back to **Logging In** form, with error message.
    - Else:
      - Go to **View Profile** form.
- Else *email* and *pin* input fields are invalid, display **Logging In** form, with error message.

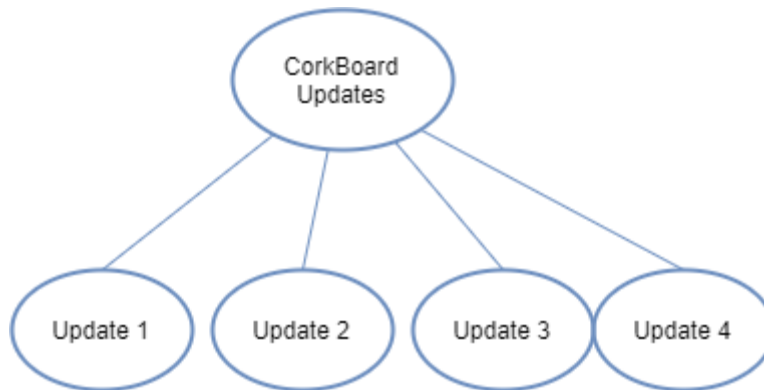
### Home Screen

#### Abstract Code

- Show "**CorkBoard Updates**", "**My CorkBoards**", "**Add CorkBoard**", "**Popular Tags**", and "**PushPin Search**" tabs.
- Upon:
  - Click **CorkBoard Updates** button- Jump to the **CorkBoard Updates** task.
  - Click **My CorkBoards** button- Jump to the **My CorkBoards** Profile task.
  - Click **Add CorkBoard** button- Jump to the **Add CorkBoard** task.
  - Click **Popular Tags** button- Jump to the **Popular Tags** task.
  - Click **PushPin Search** button- Jump to the **PushPin Search** task.

### CorkBoard Updates

#### Task Decomp



**Lock Types:**  $\leq 4$  Read locks for a User

**Number of Locks:** Several different schema constructs are needed.

**Enabling Conditions:** All 4 are enabled by a user's login or a friend's PushPin

**Frequency:** High - All 4 have the same frequency

**Consistency (ACID):** is critical, order is critical.

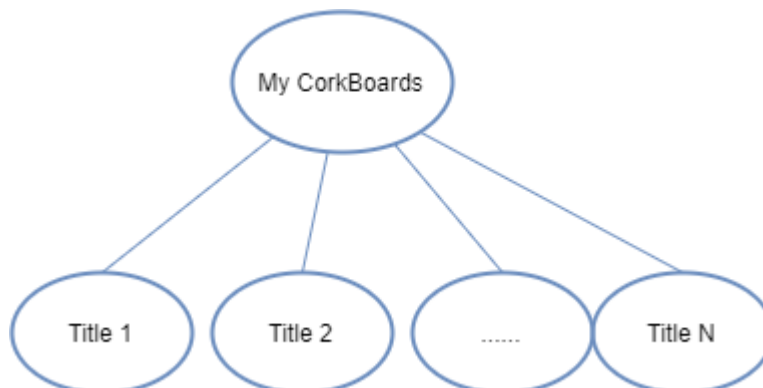
**Subtasks:** All tasks must be done. Mother task is required to coordinate subtasks. Order is necessary.

#### Abstract Code

- User clicked on **CorkBoard Updates** button from **Home Screen**:
- Run the **CorkBoard Updates** task: query for updates about the user and other users that the logged-in user watched or followed.
  - Find the latest updated CorkBoard; DisplayTitle, Owner, Date/Time of the last PushPin.
  - Find the second latest updated CorkBoard; DisplayTitle, Owner, Date/Time of the last PushPin.
  - Find the third latest updated CorkBoard; DisplayTitle, Owner, Date/Time of the last PushPin.
  - Find the fourth latest updated CorkBoard; DisplayTitle, Owner, Date/Time of the last PushPin.

#### My CorkBoards

##### Task Decomp



**Lock Types:** Multiple Write locks for a User

**Number of Locks:** Several different schema constructs are needed.

**Enabling Conditions:** All are enabled by a user's login or a user's PushPin

**Frequency:** High - All have the same frequency

**Consistency (ACID):** is critical, order is sorted alphabetically and critical.

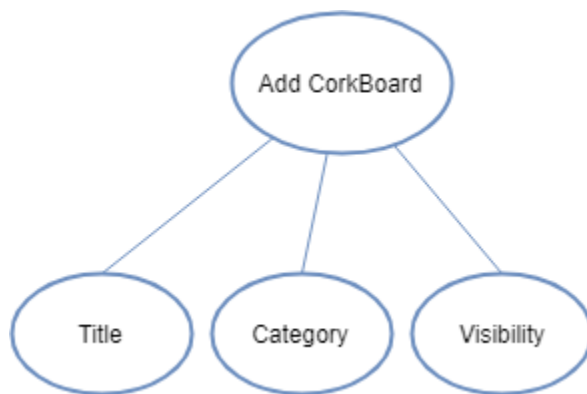
**Subtasks:** All tasks must be done. Mother task is required to coordinate subtasks. Order is necessary.

#### Abstract Code

- User clicked on **My CorkBoards** button from **Home Screen**:
- Run the **My CorkBoards** task: query for CorkBoards owned by the logged in user.
  - Sort the title of CorkBoards alphabetically;
  - Display the number of PushPin on each board.

#### Add CorkBoard

##### Task Decomp



**Lock Types:** 3 write locks of Title, Category and Visibility for a User

**Number of Locks:** Several different schema constructs are needed.

**Enabling Conditions:** All 3 are enabled by a user's click on **Add CorkBoard** button.

**Frequency:** Medium- around 1 per day per user

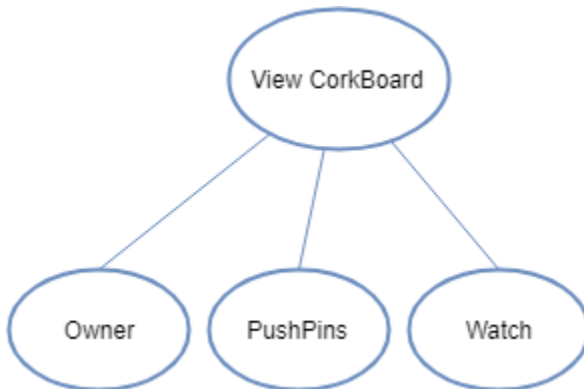
**Consistency (ACID):** is critical, order is sorted by date/time and critical.

**Subtasks:** All tasks must be done. Mother task is required to coordinate subtasks. Order is necessary.

#### Abstract Code

- User clicked on **Add CorkBoard** button from **Home Screen**:
- Run the **Add CorkBoard Task**:
  - User enters *Title*
  - Find the *Category* for the corkboard.
    - Display initial list of categories supported by CorkBoardIt
    - Find the *Category*
    - Display *Category* Name;
  - Select *Visibility: Public or Private*.
    - If *Visibility* is Public, do nothing;
    - Else user enters password.
- User Clicked on **Add** button.

## View CorkBoard Task Decomp



**Lock Types:** 2 read-only locks of Owner, PushPins and 2 write locks of Follow and Watch for a CorkBoard.

**Number of Locks:** Several different schema constructs are needed.

**Enabling Conditions:** All 3 are enabled by a user's click on **View CorkBoard** button.

**Frequency:** High - All have the same frequency

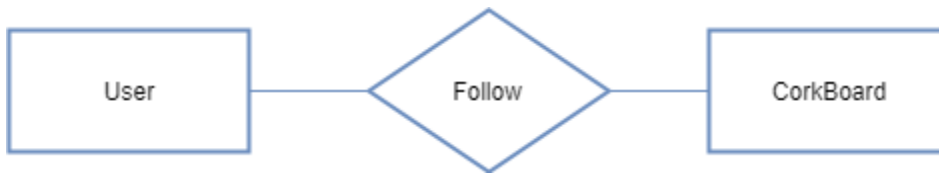
**Consistency (ACID):** is not critical, order is not critical.

**Subtasks:** All tasks must be done. Mother task is required to coordinate subtasks. Order is necessary.

### Abstract Code

- User clicked on any public CorkBoard:
- Run the **View CorkBoard** Task:
  - Display *Category, Owner, Title* and *last updated date/time* of the *CorkBoard*.
  - If logged in user owns the CorkBoard, then:
    - Enable **Add PushPin** button if this CorkBoard is owned by the current user.
  - Else:
    - Enable **Follow** button besides the owner's name.
      - If the current user clicks **Follow** button, then run **Follow Users** task.
      - Else: do nothing.
    - If the CorkBoard is public, then
      - If the current user clicks **Watch** button, then the CorkBoard's owner is added to the current user's watch list.
      - Else: do nothing.
    - Else: do nothing.
  - Display *PushPins* in this CorkBoard collection
    - The thumbnail images are hyperlinked to **View PushPin**.
  - Display the number of watchers of this CorkBoard.

## Follow Users Task Decomp



**Lock Types:** single write lock for a follow.

**Number of Locks:** Single.

**Enabling Conditions:** It is enabled by a user's click on **Follow** button.

**Frequency:** Medium.

**Consistency (ACID):** is critical, order is critical.

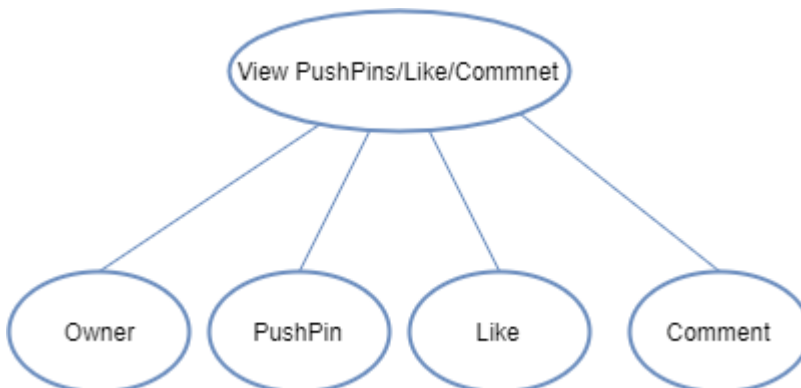
**Subtasks:** All tasks must be done. Mother task is required to coordinate subtasks. Order is necessary.

Abstract Code

- User clicked on **Follow** button:
- Run the **Follow Users Task**: add the CorkBoard's owner to the current user's *follow list*.

View PushPin

Task Decomp



**Lock Types:** 4 read-only locks of Owner, PushPin, Like and Comment for a Pushpin.

**Number of Locks:** Several different schema constructs are needed.

**Enabling Conditions:** All 4 are enabled by a user's click on **View PushPin** button.

**Frequency:** High - All have the same frequency

**Consistency (ACID):** is not critical, order is not critical.

**Subtasks:** All tasks must be done. Mother task is required to coordinate subtasks. Order is necessary.

Abstract Code

- User clicked on **View PushPin** button:
- Run the **View PushPin Task**:
  - Display *Owner, Title* and *first pinned date/time of the CorkBoard*.
  - Title is hyperlinked to CorkBoard Screen.
  - If logged in user owns the CorkBoard, then:
    - Do nothing.



- Else:
  - Enable **Follow** button besides the owner's name.
    - If the current user clicks **Follow** button, then run **Follow Users** task.
    - Else: do nothing.
- Display *PushPins* in this CorkBoard.
  - The thumbnail images are hyperlinked to **View PushPin**.
- Display Tags: sorted alphabetically.
- Display the users who liked this Pushpin
  - If the PushPin is owned by another user, then:
    - If the current user clicks **Like** Button, then run **Like** Task.
    - Else: do nothing.
    - If the current user clicks **Unlike** Button, then run **Unlike** Task.
    - Else: do nothing.
  - Else: Disable **Like** or **Unlike** Button.
- Display the comments: comments sorted with latest comment on top.
  - If the current user enter a comment and clicks **Post Comment** Button, display the comment.
  - Else: do nothing.

### Like/Unlike PushPin

#### Task Decomp



**Lock Types:** single write lock for a follow.

**Number of Locks:** Single.

**Enabling Conditions:** It is enabled by a user's click on **Like** or **Unlike** button.

**Frequency:** High.

**Consistency (ACID):** is critical, order is critical.

**Subtasks:** All tasks must be done. Mother task is required to coordinate subtasks. Order is necessary.

#### Abstract Code

- If the user clicked on **Like** button:
  - Run the **Like/Unlike PushPin Task**: Display the logged in user's name under the Pushpin; change the button to **Unlike**.
- If the user clicked on **Unlike** button:
  - Run the **Like/Unlike PushPin Task**: Remove the logged in user's name under the Pushpin; change the button to **Like**.

### Add Comments

#### Task Decomp

**Lock Types:** Both write and read on regular users

**Number of Locks:** write lock while another user is commenting and read lock

**Enabling Conditions:** Enabled by user logging in and viewing PushPin

**Frequency:** Around 200 comments per day

**Consistency (ACID):** is not critical

**Subtasks:** Mother task is not needed. No decomposition needed

Abstract Code

- User clicked on **View PushPin** from CorkBoard or **Search PushPin**:
- Run the **View PushPin** task: query for information about the PushPin either from image or search results of which hyperlink is clicked
  - Find and display the user's *first name* and *last name* under which the PushPin is saved
  - Find and display the *date* and *time* the PushPin was added and the title of the associated CorkBoard
  - Display the image and the website addresses it comes from
  - For each image, enable the collaboration between users by letting users **like/unlike** and **comment** PushPin with limitations as following:
    - If the user already likes the PushPin, the button should read "unlike"
    - A user cannot like his or her own PushPin
    - Comments cannot be deleted and should be displayed with the latest comment appearing first

### View Private CorkBoards

Task Decomp

**Lock Types:** Both read and write locks for a regular user

**Number of Locks:** Several different schema constructs are needed.

**Enabling Conditions:** enabled by a user's click on **View CorkBoard** button and type in a password

**Frequency:** low

**Consistency (ACID):** is not critical

**Subtasks:** password must be typed in before following and commenting task, mother task is necessary to coordinate subtasks, order is critical

Abstract Code

- User clicked on a private CorkBoard indicated on the home page:
- Run the **View Private CorkBoard** Task:
  - Ask the user to type in password
  - If password is correct and log in is successful, then
    - Display *Category, Owner, Title* and *last updated date/time of the CorkBoard*
    - Else: Display an error message and return to the **Password Protected** form
  - If logged in user owns the CorkBoard, then:
    - Enable **Add PushPin** button if this CorkBoard is owned by the current user.
  - Else:

- Enable **Follow** button besides the owner's name.
  - If the current user clicks **Follow** button, then run **Follow Users** task.
  - Else: do nothing.
- Display *PushPins* in this CorkBoard collection, Enable **Add PushPin** button if this CorkBoard is owned by the current user.
- The thumbnail images are hyperlinked to **View PushPin**.

### Add PushPin

#### Task Decomp

**Lock Types:** both read and write locks for a regular user

**Number of Locks:** Several different schema constructs are needed

**Enabling Conditions:** enabled by a user's click on **Add PushPin** button

**Frequency:** high

**Consistency (ACID):** is not critical

**Subtasks:** Url, Description and Tags must be done and mother task is necessary to coordinate subtasks, order is not critical

#### Abstract Code

- Check if the user is the owner of current CorkBoard,
- If yes
  - User is able to click on **Add PushPin** button from View CorkBoard form:
  - Run the **Add PushPin Task**:
    - User enters *URL of an image on the Web, a brief description (less than 200 characters) and a set of tags (optional)*
  - Else: Disable **Add PushPin** button
- *After URL of an image, a brief description (less than 200 characters) and an optional set of tags are typed in:*
  - Strings need to be parsed, tags(case-sensitive) need to be extracted and they need to be stored individually in the database
  - After the **Add** button is clicked, validate the form and add the PushPin to the CorkBoard, then the user should be returned to the View CorkBoard Screen

### Search PushPin

#### Task Decomp

**Lock Types:** Single write lock

**Number of Locks:** Single

**Enabling Conditions:** Enabled by user login and PushPin Search box on the Home Screen

**Frequency:** high

**Consistency (ACID):** is not critical

**Subtasks:** Logging in task must be done. Mother task is required to coordinate subtasks. Order is not necessary.

#### Abstract Code

- User enters some text in the search box and clicked ***Pushpin Search*** button from **Home Screen**
- Run the **Search Pushpin** task:
  - Find all the Pushpins in database whose description, tags or category match the entered text.
    - If the PushPin Search Results are public, then:
      - Display *PushPin Description, the associated CorkBoard title and the owner of the CorkBoard.*
      - Sort the results alphabetically by Pushpin description.
      - Hyperlink the description to display the **View PushPin**.
    - Else: Do not show the search results.

#### View Popular Tags

##### Task Decomp

**Lock Types:** Read-only on regular user

**Number of Locks:** Single

**Enabling Conditions:** None

**Frequency:** around 200 views per day

**Consistency (ACID):** is not critical

**Subtasks:** Mother task is not needed. No decomposition needed

#### Abstract Code

- User clicked ***View Popular Tags*** button from homepage **MainMenu**
- Run the **View Popular Tags** task:
  - Find all the tags in database
  - Count the PushPins each tag has
  - Sort above findings by:
    - the number of PushPins with highest appearing first
  - Display three columns: Tag, PushPins and Unique CorkBoards
    - Unique CorkBoards list the total number of CorkBoards that have a PushPin with the given tag
  - Limitation: Only count one time if multiple PushPins on the CorkBoard have the same tag

#### View Popular Sites

##### Task Decomp

**Lock Types:** Read-only on regular user

**Number of Locks:** Single

**Enabling Conditions:** None

**Frequency:** around 200 views per day

**Consistency (ACID):** is not critical

**Subtasks:** Mother task is not needed. No decomposition needed

#### Abstract Code

- User clicked **View Popular Sites** button from homepage MainMenu
- Run the **View Popular Sites** task:
  - Find the sites that have the most PushPin links
  - Count the number of the PushPins
  - Sort above findings by:
    - Number of PushPins with the highest appearing first

#### View CorkBoard Statistics

##### Task Decomp

**Lock Types:** Read-only on regular user

**Number of Locks:** Single

**Enabling Conditions:** None

**Frequency:** around 200 views per day

**Consistency (ACID):** is not critical

**Subtasks:** Mother task is not needed. No decomposition needed

#### Abstract Code

- User clicked **View CorkBoard Statistics** button from MainMenu
- Run the **View CorkBoard Statistics** task: query for information about the user where user ID is the ID of the current user using the system from the HTTP Session
  - Find the number of public CorkBoards the user has
  - Find the number of private CorkBoards the user has
  - Find the count of PushPins across all public CorkBoards the user has
  - Find the count of PushPins across all private CorkBoards the user has
  - Sort above findings by:
    - the number of public CorkBoards each user has
    - second by the number of private CorkBoards each user has
    - print the current user's row in red text so the rank could be easily seen.