

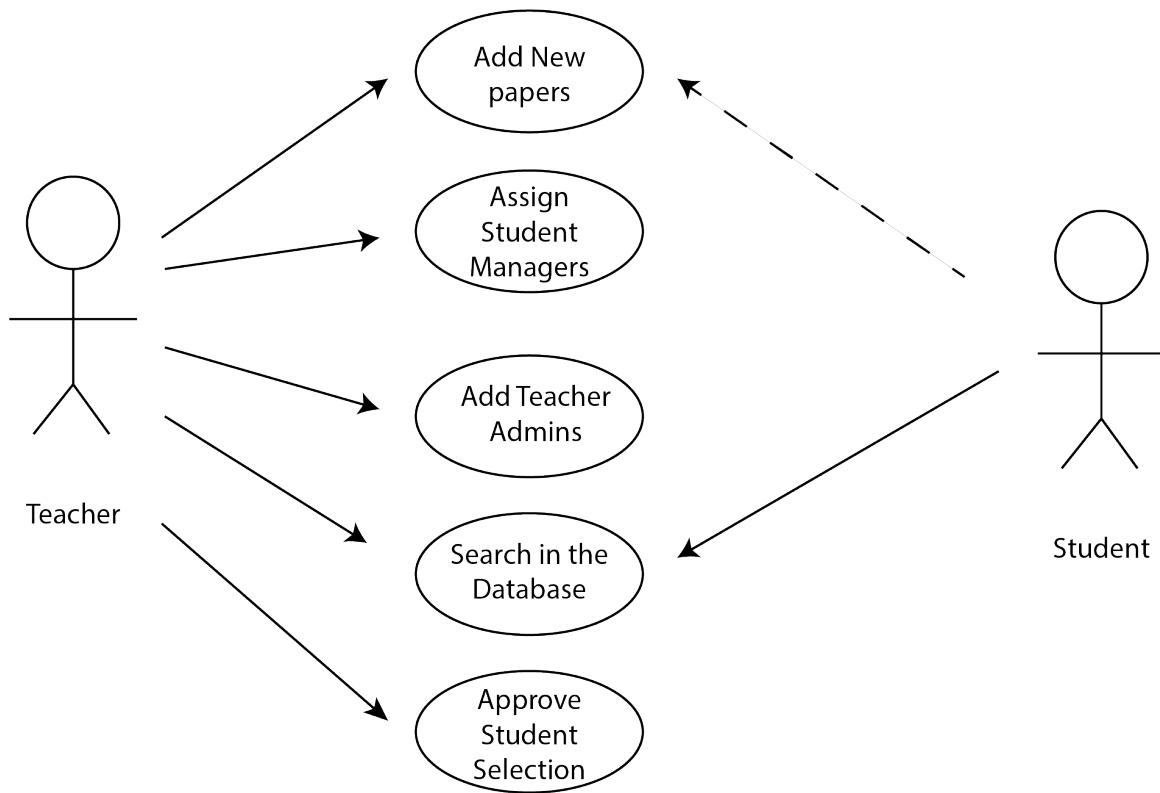
## Criterion B

### Record of Tasks

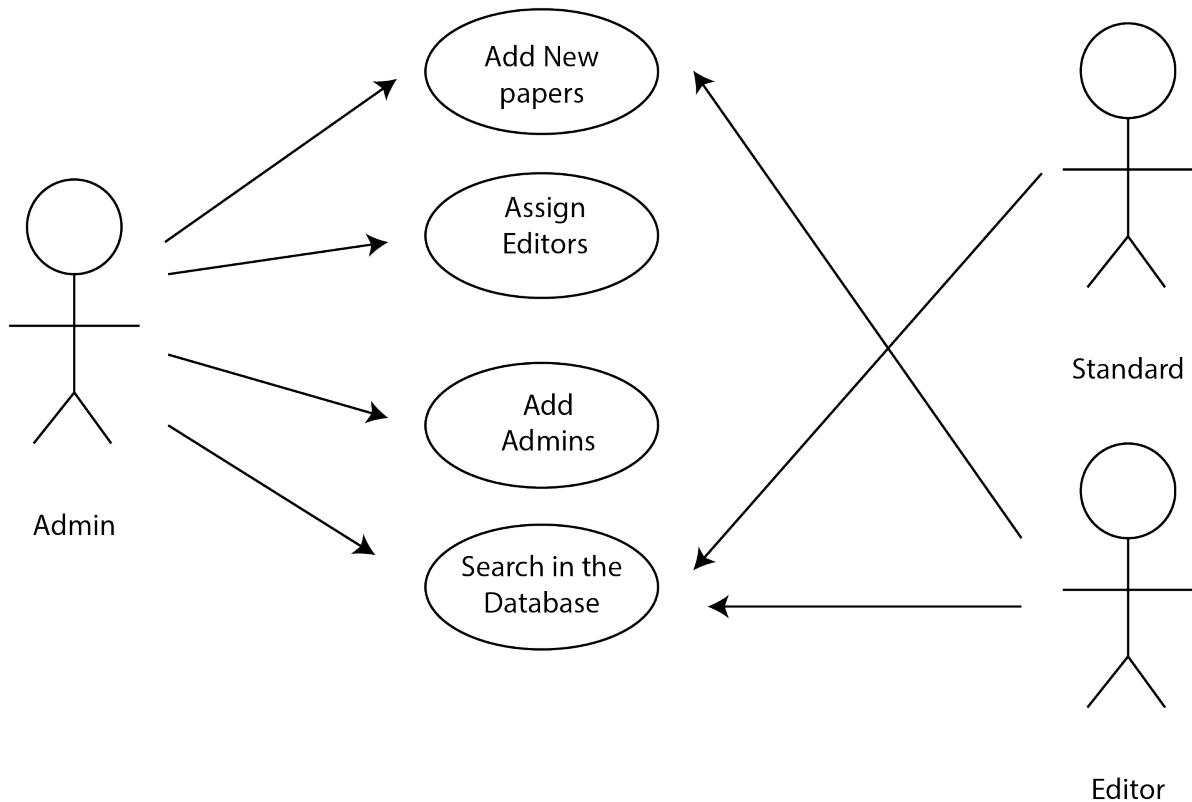
Task num-ber	Planned Action	Planned Outcome	Time Esti-mated	Target Date (yyyy/m-m/dd)	Criteria Stage
1	Interview with the client to understand her needs	Understand her needs and have a vision for the website	2 hours	2020/10/12A	Planning
2	Preliminary research to find out the tools to use	Understand the strength and weakness of different frameworks and make a choice	5 hours	2020/10/20A	Planning
3	Create the mockup for the website	Completed the mockups	2 hours	2020/10/28A	Design
4	Create a rough prototype for the UI with hardcoded data	Client confirms whether it is something she wants	4 hours	2020/11/4 B, C	Design
5	Restructure the website UI as per client's request	Client is happy with the new design	5 hours	2020/11/14C	Developing
6	Restructure the data structure of the website to allow for more flexibility	Client can create new tags and remove old ones	5 hours	2020/11/19C	Developing
7	Setting the browser to upload directly to the s3 bucket instead of through the server	Website is much faster simply because the file server is located more locally	5 hours	2020/11/25C	Developing
8	Fix a bug in django-storage because :(	The bug is fixed and the issue is still unaddressed by the library developers :(	2 hours	2020/12/4 C	Developing
9	Create the add tags page	The page is finished and functional	5 hours	2020/12/14C	Developing
10	Integrate log in with google	User can log in with Google and the UI looks integrated	6 hours	2020/12/19C	Developing
11	Refactor the user types so that different users have different permissions	User with their respective permissions can accomplish different tasks	2 hours	2020/12/22C	Developing
12	Add an admin page for admins to manage user permissions	Admins can change the permissions of other users	3 hours	2020/12/26C	Developing
13	Write the search engine	The search engine works and returns relevant results	4 hours	2021/1/2 C	Developing
14	Write the edit paper page	User can edit the paper even after it is uploaded	3 hours	2021/1/5 C	Developing
15	Get the client feedback for the finished product	Client is happy	2 hours	2020/1/9 E	Feedback

## Use Cases

### Iteration 1

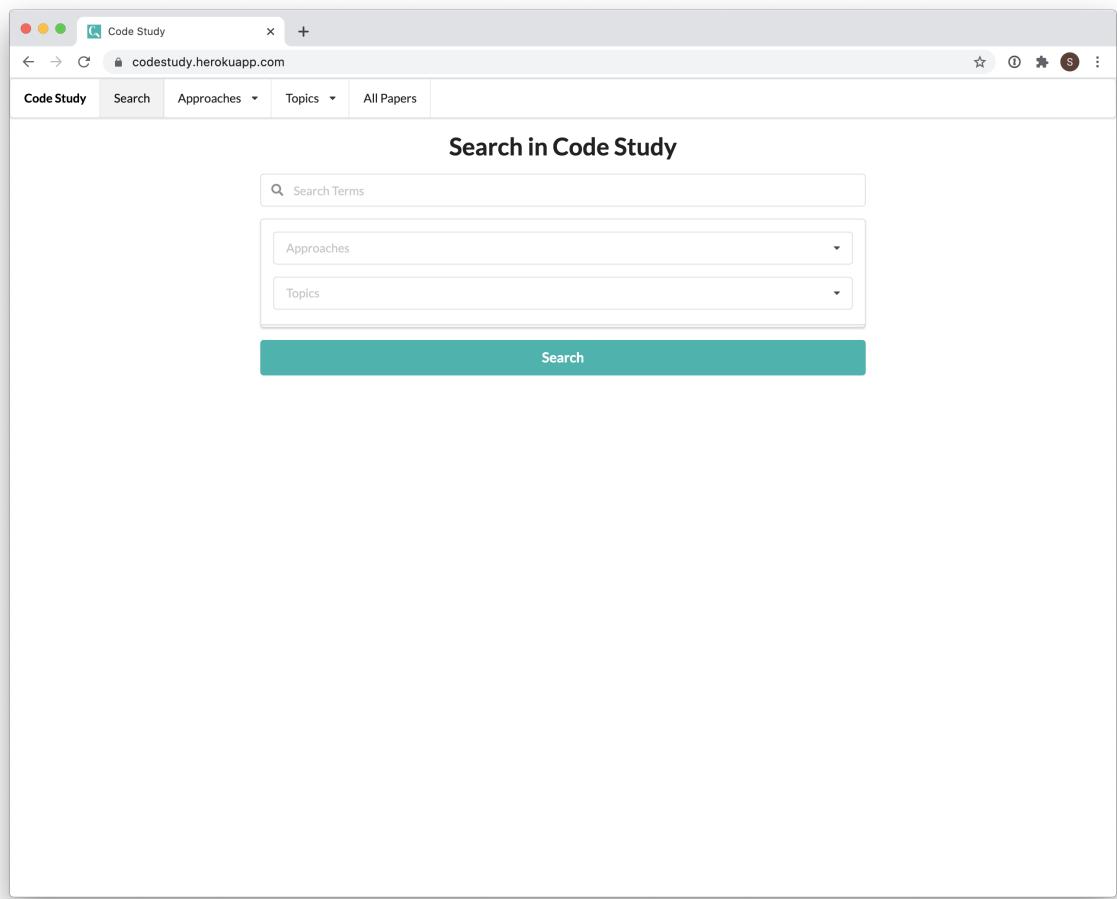


## Iteration 2



The client feedback that she would like to use the help of students to manage some paper for her but would not want them to change who can edit the papers. Therefore I have decided to refactor the user into three groups: standard, editor and admin. Standard users can only view the website and bookmark for themselves, editors can, in addition, add, edit and remove papers, and admin can, in addition, manage the permissions of users.

## Iteration 3



I have added a header to navigate to different functions of the web app, and designed a favicon for the website.

## UML

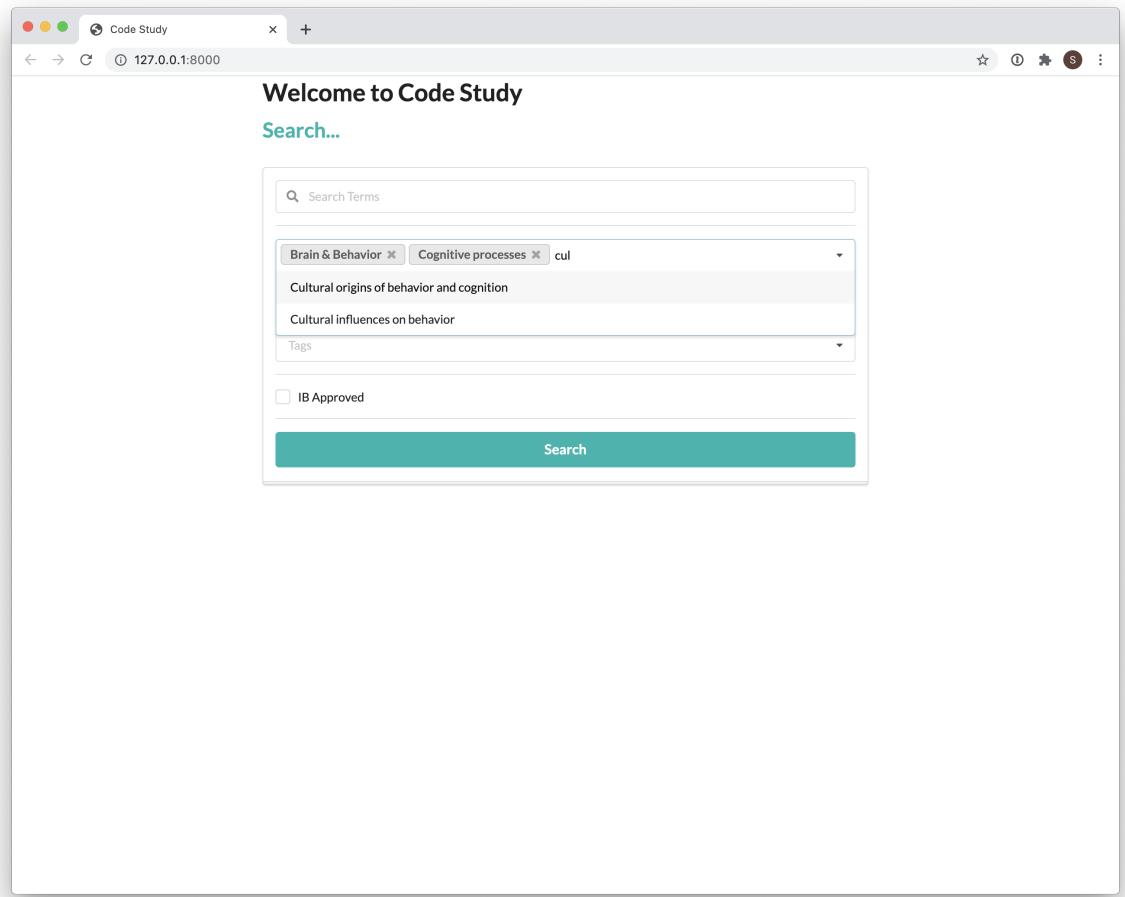
## Mockup

### Landing Page

This is the page that the user first sees when he/she open the application. It presents them options for their search. Layout is powered by Bootstrap.

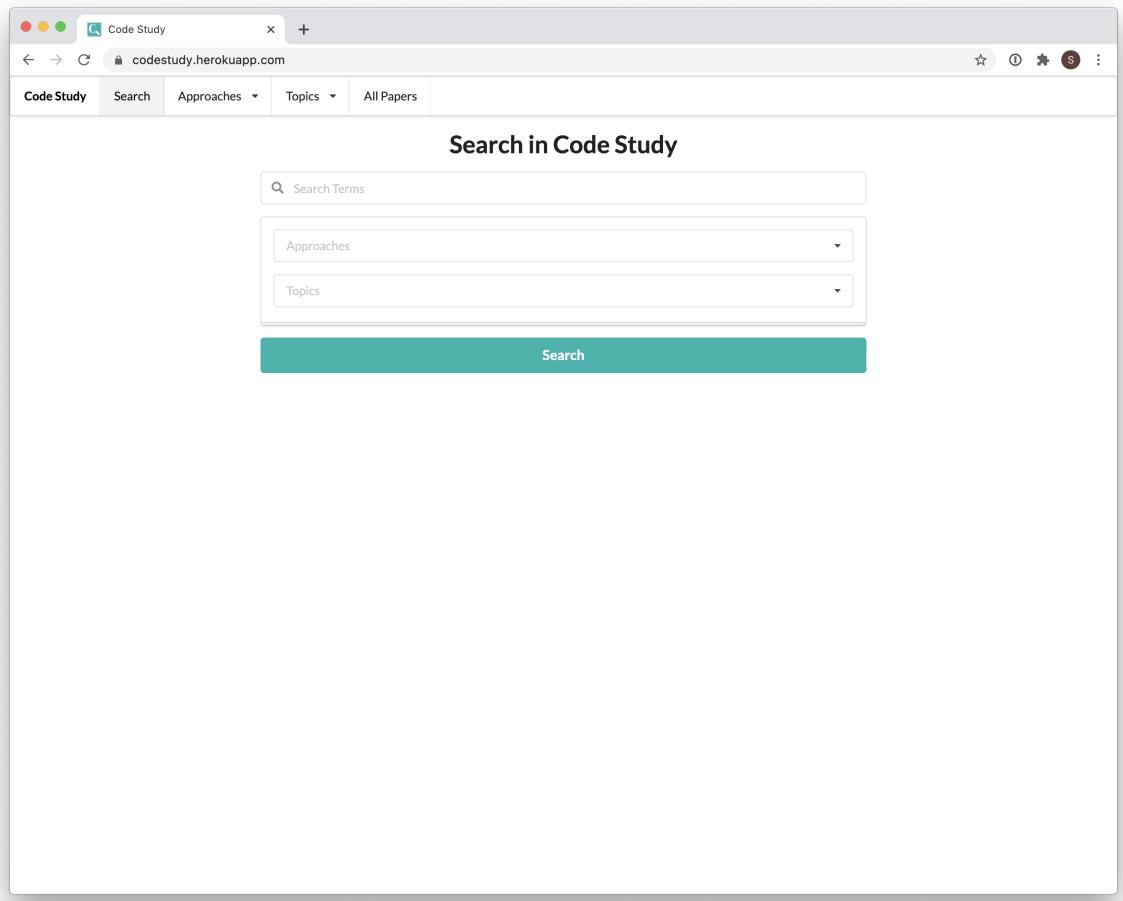
The screenshot shows a web application interface titled "Search for Code Studies". At the top, there is a header with the text "Self" and a "Search Terms" input field containing the text "Cognitive Schema". Below this, there are two dropdown menus: "Topic" and "Approach", both currently set to "Choose...". Underneath these dropdowns are two checkboxes: "IB Approved" and "Other options...". A section titled "Options" follows, containing three radio buttons labeled "#1", "#2", and "#3", with "#1" being selected. At the bottom right of the form is a large blue "Search" button.

## Iteration 1



## Iteration 2

After the first iteration, the client gave me feedback that she would want to be able to select multiple topic and approaches for each search box. After I have found no way to implement it with Bootstrap and I didn't want to write UI from scratch because it will inevitably look ugly, I found out that I could use a framework called Semantic UI.



### Iteration 3

In this iteration, I have added a navigation bar and a sign in with Google option.

## Results Page

The screenshot displays a web browser window titled "Search results" with the URL "codestudy.herokuapp.com/result/?search-terms=Bandura+Experiment&topic=Cognitive+processes&approach=Sociocultural+Approach&payment=...". The main content is titled "Search Results for Bandura Experiment". Below the title is a "Home Page" link. The page features a grid of 8 cards, each representing a different study or resource. The cards are arranged in two columns and four rows. Each card includes a thumbnail image, a title, a brief description of the content, and two buttons: "View" and "Edit". The cards are labeled with their duration: "9 mins" for all.

Card 1	Card 2
<b>Procedure and results</b> This is a wider card with supporting text below as a natural lead-in to additional content. This content is a little bit longer. <a href="#">View</a> <a href="#">Edit</a> 9 mins	<b>Card image cap</b> This is a wider card with supporting text below as a natural lead-in to additional content. This content is a little bit longer. <a href="#">View</a> <a href="#">Edit</a> 9 mins
<b>Study 1: Title...</b> Abstract: ... <a href="#">View</a> <a href="#">Edit</a> 9 mins	<b>Card image cap</b> This is a wider card with supporting text below as a natural lead-in to additional content. This content is a little bit longer. <a href="#">View</a> <a href="#">Edit</a> 9 mins
<b>Card image cap</b> This is a wider card with supporting text below as a natural lead-in to additional content. This content is a little bit longer. <a href="#">View</a> <a href="#">Edit</a> 9 mins	<b>Card image cap</b> This is a wider card with supporting text below as a natural lead-in to additional content. This content is a little bit longer. <a href="#">View</a> <a href="#">Edit</a> 9 mins
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## Iteration 1

This is the page where users get their search results in these card-like info boxes, from which they can see the results.

All Papers | Code Study

[codestudy.herokuapp.com/all-papers/](#)

Code Study	Search	Add Paper	Edit Tags	Approaches	Topics	All Papers	Alison Dolby			
 <p>Abrams et al (1990) tested the role of social identity on one's likelihood to conform. The study was investigating whether children could learn aggressive behaviour by watching the behaviour of adults.</p> <p>The abstract of the original study is available here.</p> <p><b>Procedure and results</b></p> <p>The aim of the study was to determine if in-group identity would affect one's willingness to conform.</p> <p>Abrams et al (1990) used an independent measures design which included four groups and manipulated two different independent variables. One independent variable was whether the confederates were from an ingroup or outgroup. The second independent variable was whether the participant's responses were public or private. So, it used a 2 x 2 factorial design that resulted in four conditions:</p> <ul style="list-style-type: none"> <li>In-group private response</li> <li>In-group public response</li> <li>Out-group private response</li> <li>Out-group public response</li> </ul> <p>Fifty undergraduate students (23 males and 27 females) recruited in an introductory psychology course participated. At the start of the experiment, the three confederates were introduced either as first year students from the same university, or as third year students from a different university (the same university, or which was the same length as the stimulus line). The task was to identify which of the three lines matched the stimulus line. The confederates gave a unanimous, incorrect response.</p> <p>In each session the confederates and one naïve participant sat at a table facing the monitor. The participant and one of the confederates were asked to identify the stimulus line. The other confederate was asked to identify the opposite end of the participant. The naïve participant was asked to identify the stimulus line. The confederates gave their judgments and the experimenter recorded the naïve participant's responses. In the procedure, the confederates were asked to "operate the computer". The naïve participant, who happened to be research, was asked if he or she would like help operating the computer. If the participant said yes, the confederates would help him/her. After the task, the naïve participant recorded their responses on a score sheet along with his or her own.</p> <p>Seventy-seven percent of participants conformed to the erroneous confederates judgments on at least one trial. This is very similar to the results of the original Asch experiments. The mean age of the participants was 18 out of a possible 42 (<math>M = 32</math> years). This is very similar to the results of the original Asch experiments.</p> <p>Conformity was measured in the in-group public condition with a mean number of confirming responses of 3.13 and in the in-group private condition with 2.87. The out-group public and out-group private conditions did not differ significantly (<math>M_s = 3.05</math> and 2.33, respectively).</p> <p><b>Abrams, 1990 SIT Conform</b></p> <p>Abrams et al (1990) tested the role of social identity on one's likelihood to conform. The researchers used the basic procedure of the Asch paradigm (though they used computers and projected the lines!), but they looked at the role of in-groups and out-groups on the naïve participant's behaviour.</p> <p>No tag added</p> <p><a href="#">Edit</a> <a href="#">Bookmark</a></p>	 <p>One of the great classic experiments of social psychology was carried out by Albert Bandura. The study has come to be known as the Bashing Bobo study. The study was investigating whether children could learn aggressive behaviour by watching the behaviour of adults.</p> <p>The study is quite complex and has a lot of detail. The summary below is based on the original study by Bandura and Rector (1961).</p> <p>The study can be used to discuss social cognitive theory, as well as ethics and research methods in the study of the individual and the group.</p> <p><b>Background information</b></p> <p>Bandura's approach was an extension of Behaviourism and basically sees people as being shaped by their environment. He believed that we experience every day Bandura's social cognitive learning theory argued that we do not learn only by what we experience directly, but also by observing others. When we observe others, we may imitate that behaviour with the goal of getting the same reward. This is known as vicarious reinforcement.</p> <p>His study is a classic, although you will see that there are some ethical concerns with how the study was carried out.</p> <p><b>Procedure and results</b></p> <p>In this study, Bandura set out to demonstrate that if children are exposed witnesses to an aggressive display by an adult, they will imitate the aggressive behaviour when given the opportunity. More specifically, the study had two main goals:</p> <ul style="list-style-type: none"> <li>• children exposed to aggression models will reproduce aggressive acts resembling those of the models</li> <li>• children will imitate the behavior of a same sex model to a greater degree than a model of the opposite sex</li> </ul> <p>Thirty boys and 36 girls aged between 37 and 89 months were tested. The mean age was 52 months. They used one male adult and one female adult to act as role models.</p> <p>The study had three major conditions: a control group, a group exposed to an aggressive model and a group exposed to a non-aggressive model. The control group received no exposure to any models. There were three independent variables. A summary of the groups is shown in the table below.</p> <p><b>The eight experimental conditions</b></p> <table border="1"> <thead> <tr> <th>Boys with same-sex aggressive condition</th> <th>Boys with opposite-sex aggressive condition</th> <th>Boys with same-sex model - non-</th> <th>Boys with opposite-sex model - non-</th> <th>Girls with same-sex aggressive condition</th> <th>Girls with opposite-sex aggressive condition</th> <th>Girls with same-sex model - non-</th> <th>Girls with opposite-sex model - non-</th> </tr> </thead> </table> <p><b>Bandura, 1961 SCT SLT</b></p> <p>The study has come to be known as the Bashing Bobo study. The study was investigating whether children could learn aggressive behaviour by watching the behaviour of adults.</p> <p><b>Approaches: Biological, Sociocultural</b></p> <p><b>Topics:</b> The relationship between genetics and behavior, Emotion and cognition</p> <p><a href="#">Edit</a> <a href="#">Bookmark</a></p>	Boys with same-sex aggressive condition	Boys with opposite-sex aggressive condition	Boys with same-sex model - non-	Boys with opposite-sex model - non-	Girls with same-sex aggressive condition	Girls with opposite-sex aggressive condition	Girls with same-sex model - non-	Girls with opposite-sex model - non-	 <p>One aspect of the Social Identity Theory is that we tend to show in-group bias - that is, a preference for people in our own group and bias against those that are not in our group. The following study by Bagby and Rector used real social identities - Canadian Francophones and Anglophones - in order to test the effect of in-group bias on the behaviour of jurors in a courtroom scenario.</p> <p><b>Background information</b></p> <p>The classic study of Social Identity Theory, carried out by Tajfel (1978), had two key findings. First, the study showed that in-group members are more likely to give rewards to other members of their group than out-group members. Second, the study showed that in-group members are more likely to give rewards to other members of their group than out-group members.</p> <p>The following study may be used to discuss social identity theory - or to discuss research methods and/or discuss the state of the individual and the group.</p> <p><b>Procedure and results</b></p> <p>The classic study of Social Identity Theory, carried out by Tajfel (1978), had two key findings. First, the study showed that in-group members are more likely to give rewards to other members of their group than out-group members. Second, the study showed that in-group members are more likely to give rewards to other members of their group than out-group members.</p> <p>The second key finding was that groups demonstrated an ingroup bias - the tendency to favor one own group over another. This was demonstrated in a study by Bagby and Rector (1992). In this study, 102 psychology students from the University of Quebec in Montreal, 27 per cent of the sample was made up of French-speaking students and 73 per cent English-speaking students. The researchers carried out a true experiment to test if social identity would influence their objectivity when reading a transcript of a rape trial.</p> <p>The participants were asked to read a transcript of a rape trial which varied in the ethnicity of the defendant and the victim. In some cases, the defendant was a native English speaker and the victim was a native French speaker. In other cases, the defendant was a native French speaker and the victim was a native English speaker. And so on.</p> <p>The defendant was in French.</p> <p>The participants were randomly allocated to four conditions, as follows: French defendant/French victim; French defendant/English victim; English defendant/English victim; English defendant/French victim.</p> <p>In each condition, the participants were asked to read a transcript of a rape trial. The only difference was the ethnicity of the defendant and the victim. After reading the transcript, the participants were asked to determine the guilt of the defendant on a 7-point scale, with 1 being "definitely guilty".</p> <p><b>Bagby &amp; Rector, 1992 SIT in-group bias</b></p> <p>One aspect of the Social Identity Theory is that we tend to show in-group bias - that is, a preference for people in our own group and bias against those that are not in our group. The following study by Bagby and Rector used real social identities - Canadian Francophones and Anglophones - in order to test the effect of in-group bias on the behaviour of jurors in a courtroom scenario.</p> <p><b>Approaches: Sociocultural</b></p> <p><b>Topics:</b> The relationship between genetics and behavior, The reliability of cognitive processes</p> <p><a href="#">Edit</a> <a href="#">Bookmark</a></p>
Boys with same-sex aggressive condition	Boys with opposite-sex aggressive condition	Boys with same-sex model - non-	Boys with opposite-sex model - non-	Girls with same-sex aggressive condition	Girls with opposite-sex aggressive condition	Girls with same-sex model - non-	Girls with opposite-sex model - non-			

## Iteration 2

This iteration is unchanged in principle compared with the first iteration, but since I changed the framework, the design looks different.

### Edit Tags Page

This page is used to add and delete tag and tag groups in the database.

## Iteration 1

### Design Description

The program is entirely based on the web, part of the functionality will be accomplished through JS running on client's computer, but a core part of the program will be accomplished through back-end code in Python running on Heroku and storage stored in AWS S3. The UI will be rendered using client's web browser

### Class Dictionary

#### Class - Paper

This class represents a paper stored in the database

#### Properties

#### Iteration 1

Property	Signature	Description
Name		
tags	tags: String[]	This returns the tags that the paper is associated with through manual assignment or automatic detection by the classifier.
topics	topics: String[]	Self-explanatory. Similar as above.
approaches	approaches: String[]	Self-explanatory. Similar as above.

Property	Signature	Description
Name		
methods	methods: String[]	Self-explanatory. Similar as above.
ethics	ethics: String[]	Self-explanatory. Similar as above.
pdf	pdf: File	This stores the pdf of the paper
png	png: File	This stores the screenshot of the first page to be displayed on the results page.
text	text: String[]	This is the content of the paper, extracted in plain text form to increase the search speed.

## Iteration 2

Property	Signature	Description
Name		
title	title:String	This is the title of the paper that the user inputs, short and direct.
description	description:String	This is the description of the paper that the user inputs. It can be used as a abstract of the paper.
tags	tags: String[]	This returns the tags that the paper is associated with through manual assignment or automatic detection by the classifier.
pdf	pdf: File	This stores the pdf of the paper
png	png: File	This stores the screenshot of the first page to be displayed on the results page.
text	text: String[]	This is the content of the paper, extracted in plain text form to increase the search speed.

I realised that the user wants more flexibility to add and remove tag that I cannot foresee during development, so I've generalized the class to allow for more flexibility.

**Methods** This class does not have any method.

## Class - Search Engine

This is an API for interacting with the search engine that returns the paper given some phrases. The implementations of the methods are not shown here. It might be implemented with the Google Search Engine or one that I write myself. A search engine is algorithm-based, therefore it's difficult to break it down into smaller methods.

**Properties** This class does not have any property.

## Methods

### Iteration 1

Method	Signature	Description
Name		
searchPapers	Papers(keywords: String[], tags: String[], topics: String[], approaches: String[], methods: String[], ethics: String[]): Paper[]	This returns the set of paper, in order of relevance, based on a series of parameters the user has given.

## Iteration 2

Method Name	Signature	Description
searchPapers(tags:Tag[], user: User)	searchPapers(keywords: String[], tags:Tag[], user: User): Paper[]	This returns the set of paper, in order of relevance, based on a series of parameters the user has given.

Since the refactor, the tags do not have their hard coded tag groups, so the method parameter is less.

## Class - User

This class represents a registered user

### Properties

#### Iteration 1

Property Name	Signature	Description
name	name: String	The name of the user. re
email	name: Email	The email of the user.
type	type: UserType	The type of the user, i.e. whether it is a standard user, an editor or an admin.

#### Iteration 2

Property Name	Signature	Description
name	name: String	The name of the user.
email	name: Email	The email of the user.
type	type: UserType	The type of the user, i.e. whether it is a standard user, an editor or an admin.
bookmarks	bookmarks: Paper[]	The papers that the users have bookmarked.

This iteration reflects the added functionality of allowing users to bookmark paper and having users who have different permissions.

**Methods** This class does not have any method.

## Algorithm / DFD

The following code is written in python-like pseudocode.

### Uploaded Paper processing

```
def process_pdf(paper):
    screenshot = screenshot_pdf(paper)
    text = extract_text(paper)
```

```

    return screenshot, text

def screenshot_pdf(paper):
    ... # To be implemented using external library
    return screenshot

def extract_text(paper):
    raw_text = ... # To be implemented using external library
    text = raw_text.lower().replace(continuous-white-space, " ").replace(punctuations,
        ↪ "")

```

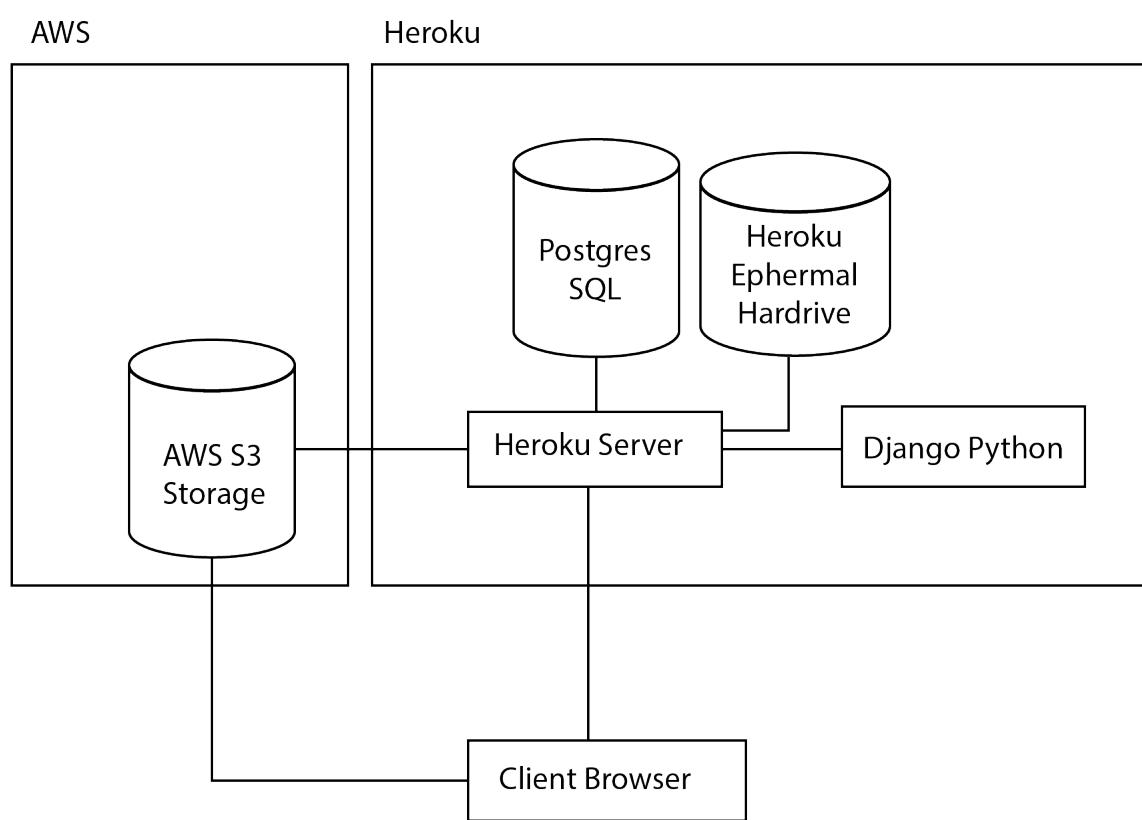
## Search algorithm

```

def search_ranked(terms, tags, user):
    terms = terms.lower().replace(continuous-white-space, " ").replace(punctuations,
        ↪ "")
    scores = {}
    for paper in database.all_papers:
        scores[paper] = 0
    for paper in database.all_papers:
        score = scores[paper]
        if paper.is_bookmarked_by(user):
            scores += weighting
        score += levenshtein_distance_score(terms, paper.title) * weighting
        score += levenshtein_distance_score(terms, paper.description) * weighting
        score += levenshtein_distance_score(terms, paper.text) * weighting
        # paper.tags_contains_count(tags) is the size of the intersection of tags of
        ↪ the paper and tags.
        # paper.tags_no_contain_count(tags) count the size of the relative complement
        ↪ of the tags in the paper in tags.
        score += paper.tags_contains_count(tags) / len(tags) * weighting
        score += paper.tags_no_contain_count(tags) / len(max([paper.
            ↪ tags_no_contain_count(tags) for paper in database.all_papers])))
    return scores.sorted_by_value()

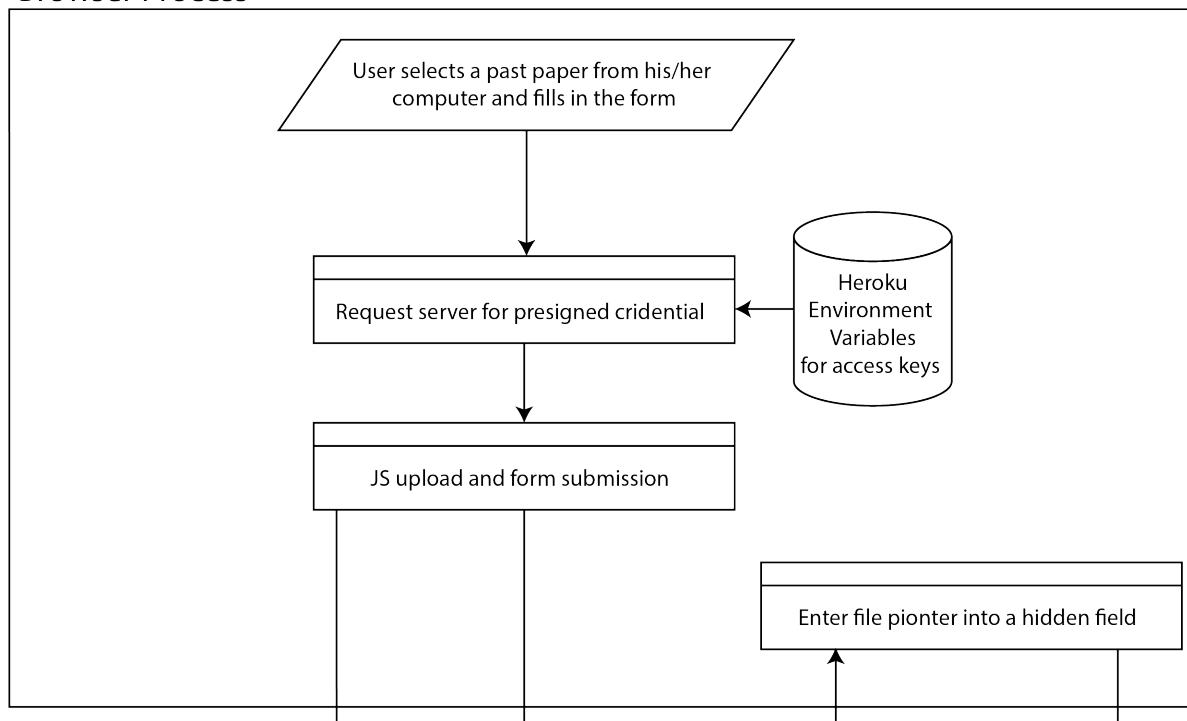
```

## Infrastructure

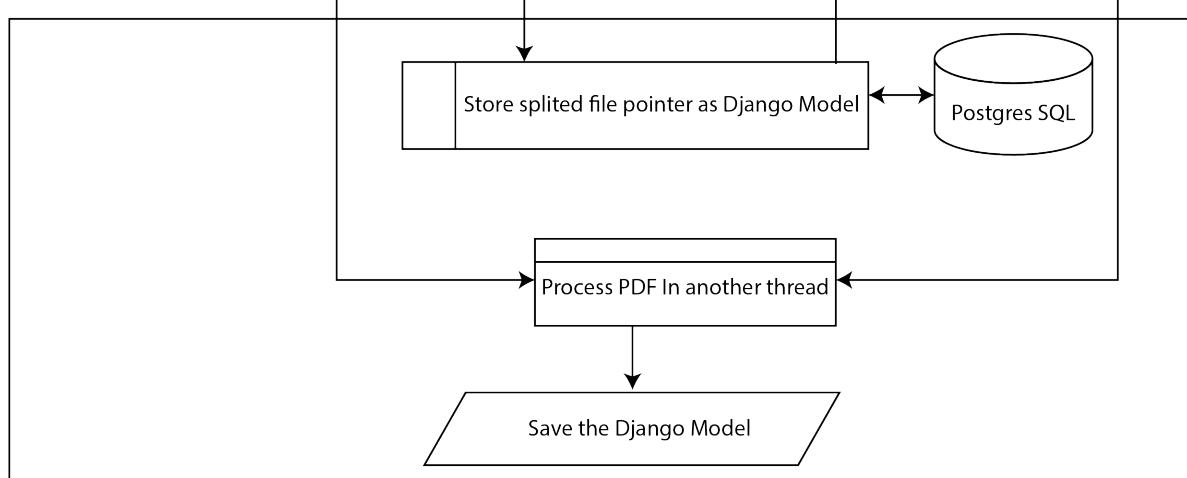


## Upload Paper

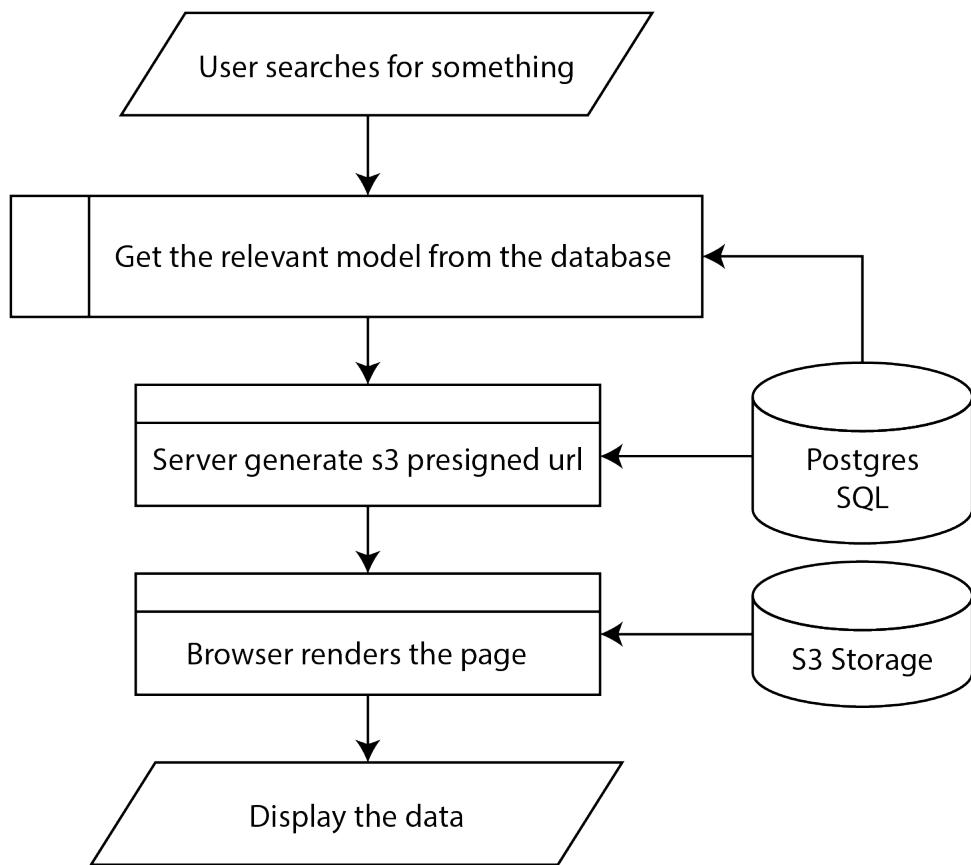
### Browser Process



### Server Process



## Search Results



## Test Plan

Action to Test	Method of Testing	Expected Results	Success Criteria
When the upload is invalid, it should gracefully fall back to an non-intrusive error message	Alpha Testing, Beta Testing, User Acceptance Testing, Debugging	Normal Input: The user uploads a paper. Expected Output: The website responds immediately to user's and start processing. Abnormal Input: The user selects a file that is not a PDF, leaves some fields empty, or clicks the button multiple times. Expected Output: The website should nicely notify the user that they have not inputted the right data (i.e. no js alter()). The user should not be able to submit the form multiple times. Extreme Input: Adversary tries to upload paper into the base without permission. Expected Output: The website should block the request.	1.1, 2.2
User should be notified when there is an error in the server	Alpha Testing, Debugging	Normal Input: Everything works in the server. Expected Output: Everything proceeds as normal. Abnormal Input: The server crashes. Expected Output: A custom 500 page that notifies the user that something went wrong in the server. Extreme Input: The server crashes again when trying to catch the error. Expected Output: falls back to an even safer error page that is more unlikely to fail.	All

Action to Test	Method of Testing	Expected Results	Success Criteria
If a paper fails to upload or process, the server should display as much information as possible without entirely crashing	Alpha Testing, Debugging	Normal Input: Everything works. Expected Output: Everything proceeds as normal. Abnormal Input: The file is corrupt such that the server cannot process the file. Expected Output: when the user requests for the file, the server should display that the file has failed to render, but the failure should not affect any other paper. Extreme Input: the file triggers an exception in unexpected place. Expected Output: the paper that is being uploaded should be the only paper that is affected by the bug.	1.3, 1.6, 1.7
User can log in	Alpha Testing, Beta Testing, User Acceptance Testing	Normal Input: the user logs in with Google clicking the right buttons. Expected Output: the user logs in as normal. Abnormal Input: the user logs in with the wrong email account. Expected Output: the user is still logged in, but they can log out. Extreme Input: the user does not accept any cookie. Expected Output: login fails.	1.4, 2.1, 2.2
Support for zooming	Alpha Testing, User Acceptance Testing	Normal Input: the user views it on a desktop or laptop with a large screen, or the user views it on a phone with a small screen. Expected Output: The website functions as normal and all functions are accessible. Abnormal Input: The user zooms in too much. Expected Output: The website UI breaks down. Extreme Input: none	3.1
All the links in the website are valid	Alpha Testing, Beta Testing, User Acceptance Testing	Normal Input: The user clicks on a link on the page. Expected Output: the website functions as normal. Abnormal Input: The user enters something random into the browser address bar. Expected Output: the website returns a nice 404 page with helpful links. Extreme Input: attacker tries to inject code with the url. Expected Output: the server blocks it.	All