Final Project Plan

Phase 1
CS 4376.0U1
Team 1
Team URL: https://cs-4376-cyberminer.herokuapp.com/
Rotating Leader: Ilhaam Syed

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Meetings:

1. Saturday June 10th @1:00 PM, ECSW Lobby & Remote (**All team members** created diagrams and discussed implementation details) (**Agenda:** Go over implementation details to clear up confusion among members, discuss major components of the system, draw rough drafts of diagrams) (**Summary:** Ilhaam responsible for use case diagrams, Tyler & Areebah & Nathan responsible for class diagrams & sequence diagrams)
2. Wednesday June 14 @ 6:30 PM, Remote (discord) (**All team members** did a dry run of our presentation and assigned slides to one another to present) (**Agenda:** aim to keep presentation under 15 minutes, decided which elements of our presentation require extra explanation) (**Summary:** Mathew responsible for slide 1 and 2 (demo), Nathan responsible for slide 3 and 4, Areebah responsible for slide 5, Tyler responsible for slide 6 and 7, Ilhaam responsible for use case diagram and template. Darrien will be our timekeeper.

1. Introduction

1.1 Project overview

The following document will describe the planning, scheduling, and team organization involved in implementing the Comet Crawler web search engine. The project's end goal is to create a system that will provide users with relevant information using the keywords entered by the user. The resulting data provided to the end user will be a sorted and filtered list of web page URLs.

The major components of the search engine will include a search interface, indexing system, result filtering, query processing, etc. The search interface will allow the end user to interact with the system, enter search queries, and retrieve information. The indexing system will organize, store, and rank information to allow for a reasonably fast search. Result filtering will ensure that our system provides users with relevant, up-to-date data in sorted order. Finally, the query processing component of the project will be responsible for interpreting user inputs, identifying keywords in said input, performing index lookup, and retrieving results.

1.2 Project deliverables

A) Preliminary Project Plan	06/01/2023
B) Interim Project	06/15/2023
C) Final Project I Submission	06/29/2023
D) Interim Project II	07/13/2023
E) Final Project II Submission	08/01/2023

1.3 Evolution of this document

Revision History

Who	**When**	**Changes**
Tyler Hargreaves	May 29th	Started document
Areebah Fatima	May 30th	Began Preliminary Documentation; Wrote project description, deliverables, etc.
Nathan Heindl	May 30th	Wrote project responsibilities and management priorities
Tyler Hargreaves	June 11th	Updated to reflect recent decisions and architecture changes
Areebah Fatima	June 28	Added updated diagrams and user manual etc.

1.4 References

I.	Team Source Code Website	https://github.com/tyharg/CS-4376
II.	Team Demo Website	https://cs-4376-cyberminer.herokuapp.com/
III.	Course Homepage	https://personal.utdallas.edu/~chung/OOD/syllabus.htm
IV.	Getting Started with Rails	https://guides.rubyonrails.org/getting_started.html

Cited References

[1] Booch, G., Rumbaugh, J., & Jacobson, I. (1999). *The Unified Modeling Language User Guide*. Addison-Wesley.

1.5 Definitions, acronyms, and abbreviations

UML: Unified Modeling Language
CI/CD: Continuous Integration / Continuous Delivery

2. Project organization

2.1 Process model 2.2 Organizational structure

Team Members: Tyler Hargreaves, Darrien Kramer, Ilhaam Syed, Nathan Heindl, Areebah Fatima, Matthew Bedford

Deliverable	**Team Leader**
Preliminary Project Plan	Tyler Hargreaves
Interim Project	Darrien Kramer
Final Project I Submission	Ilhaam Syed
Interim Project II	Nathan Heindl
Final Project II Submission	Matthew Bedford
Project Phase I and II Presentation	Areebah Fatima

2.3 Organizational boundaries and interfaces 2.4 Project responsibilities

Every member will be involved in both of the project's main two life cycles. Team leaders are specifically to turn in work, keep workflow on track, and organize meetings. For more specific responsibilities they will be discussed at a later date.

3. Managerial process

3.1 Management objectives and priorities

The team leaders are to help manage meetings, turn in deliverables, and keep everyone up to date on the project's progression. If subgroups are used then it's the team leader's responsibility to make sure both teams have what they need to complete their work.

3.2 Assumptions, dependencies, and constraints

Because we are implementing a long-term-support version of Ruby on Rails, we will be operating under the presumption that HTTP dispatching, database access, and other core functionality is handled appropriately. This design philosophy allows us to concern ourselves with engineering the search algorithm and other important application-specific features.

The application is dependent on Rails and its own dependencies. A full list of requirements can be found at: https://github.com/tyharg/CS-4376/blob/main/Gemfile

3.3 Risk management

The project will be hosted on Heroku and will implement a basic CI/CD pipeline to ensure that deployed code will have a high probability of accuracy.

3.4 Monitoring and controlling mechanism

4. Technical process

4.1 Methods, tools, and techniques

The Creately workspace will be the modeling tool our team will use to create our Use Case, Class, and Sequence Diagrams. The programming language our team has agreed to for the project is Ruby, and we will be utilizing the Rails framework to handle HTTP requests and database access. We will additionally be using various packages such as Pry and AppMap to analyze our program and create diagrams.

Our team will use the following tools to communicate: the Discord social platform, Google Docs, and Microsoft Teams. In addition to these communication tools, our team will host in-person meetings when needed.

4.2 Software documentation

The application aims to utilize automatically generated documentation wherever possible. This is done to avoid the Achilles heel of outdated documentation.

- Main readme: https://github.com/tyharg/CS-4376/tree/main
- User manual: Click Here to View

4.3 Project support functions

- Rails testing infrastructure: https://guides.rubyonrails.org/testing.html

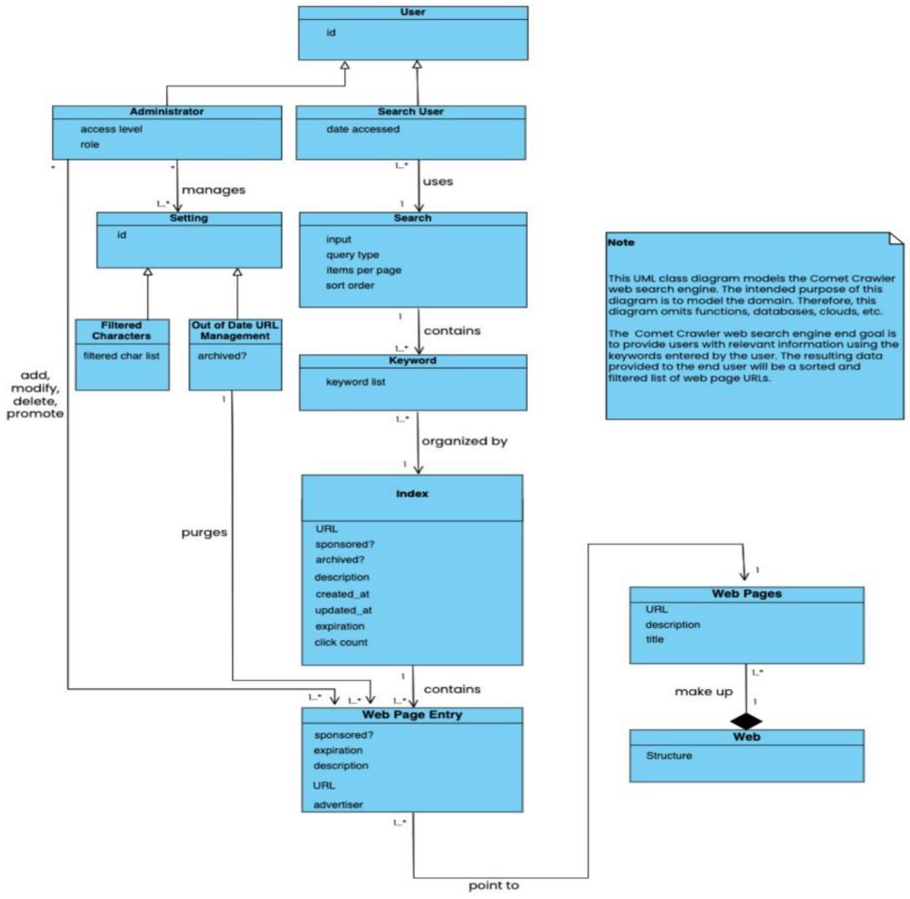
5. Work elements, schedule, and budget

This project is scheduled to be completed by August 1st, 2023. Listed below is the project deliverable due date.

Deliverable	**Due By**
Preliminary Project	June 1, 2023
Interim Project I	June 15, 2023
Final Project I Submission	June 29, 2023
Interim project II	July 13, 2023
Final Project II Submission	August 1, 2023

6. Diagram

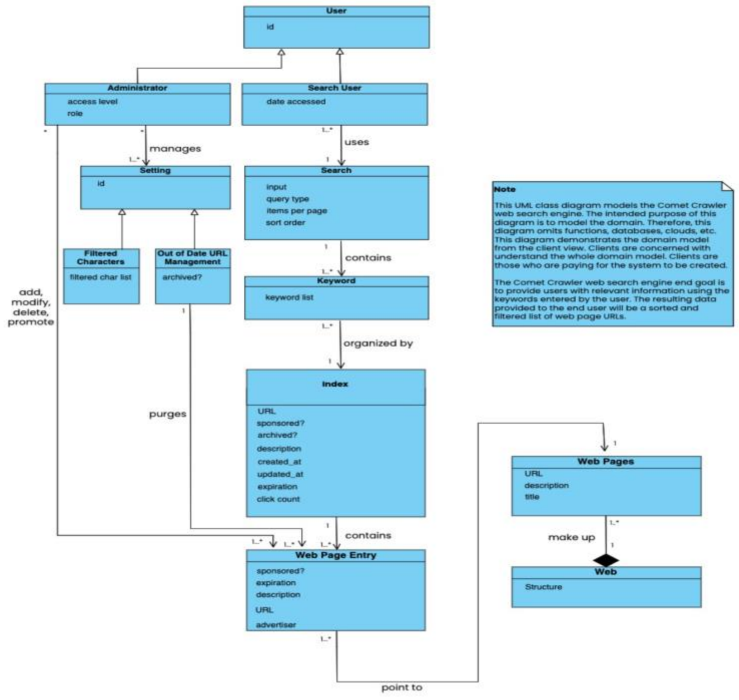
Domain Model Class Diagram: (Part of business model)



This UML class diagram models the Comet Crawler web search engine. The intended purpose of this diagram is to model the domain. Therefore, this diagram omits functions, databases, clouds, etc.

The Comet Crawler web search engine end goal is to provide users with relevant information using the keywords entered by the user. The resulting data provided to the end user will be a sorted and filtered list of web page URLs.

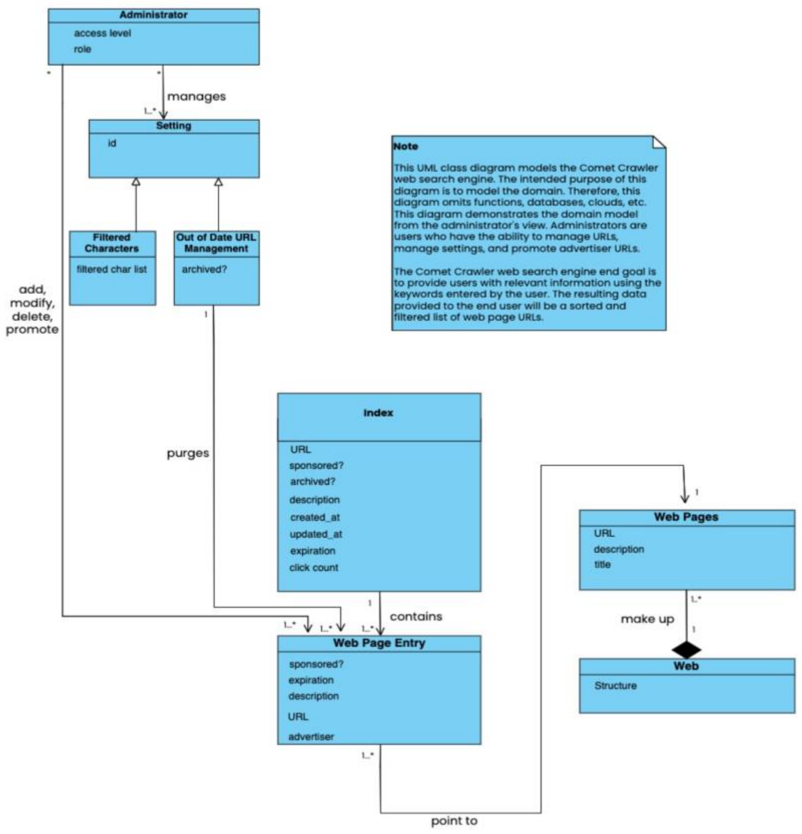
Stakeholder Class Diagram: Client (Part of business model)



This UML class diagram models the Comet Crawler web search engine. The intended purpose of this diagram is to model the domain. Therefore, this diagram omits functions, databases, clouds, etc. This diagram demonstrates the domain model from the client view. Clients are concerned with understand the whole domain model. Clients are those who are paying for the system to be created.

The Comet Crawler web search engine end goal is to provide users with relevant information using the keywords entered by the user. The resulting data provided to the end user will be a sorted and filtered list of web page URLs.

Stakeholder Class Diagram: Administrator (Part of business model)

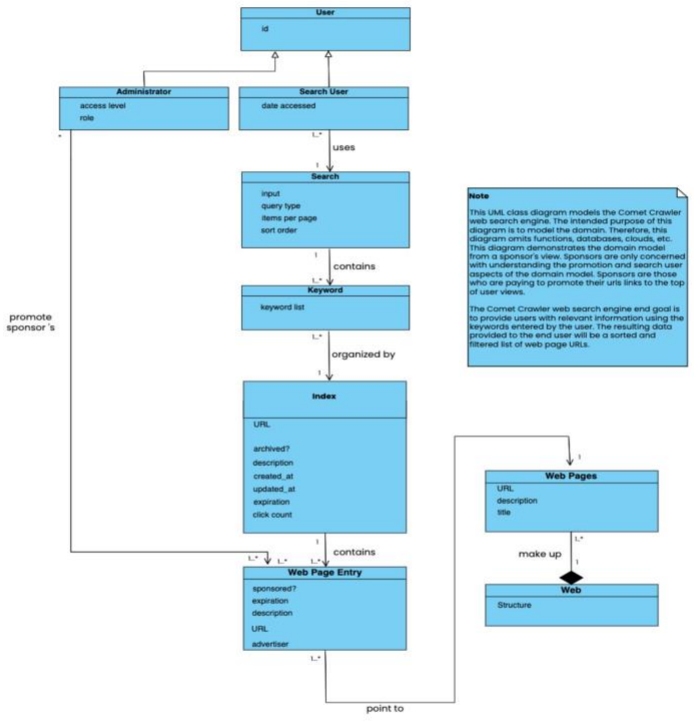


Note

This UML class diagram models the Comet Crawler web search engine. The intended purpose of this diagram is to model the domain. Therefore, this diagram omits functions, databases, clouds, etc. This diagram demonstrates the domain model from the administrator's view. Administrators are users who have the ability to manage URLs, manage settings, and promote advertiser URLs.

The Comet Crawler web search engine end goal is to provide users with relevant information using the keywords entered by the user. The resulting data provided to the end user will be a sorted and filtered list of web page URLs.

Stakeholder Class Diagram: Sponsor (Part of business model)

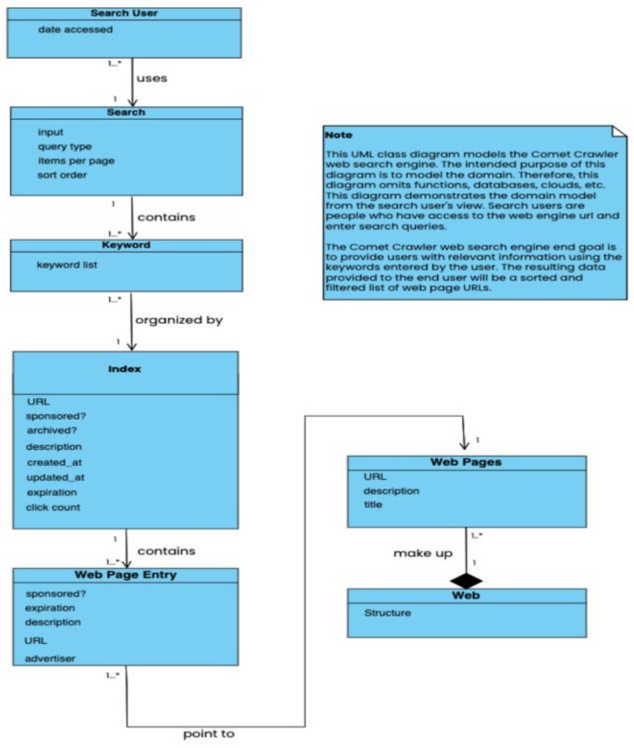


Note

This UML class diagram models the Comet Crawler web search engine. The intended purpose of this diagram is to model the domain. Therefore, this diagram omits functions, databases, clouds, etc. This diagram demonstrates the domain model from a sponsor's view. Sponsors are only concerned with understanding the promotion and search user aspects of the domain model. Sponsors are those who are paying to promote their urls links to the top of user views.

The Comet Crawler web search engine end goal is to provide users with relevant information using the keywords entered by the user. The resulting data provided to the end user will be a sorted and filtered list of web page URLs.

Stakeholder Class Diagram: Search Users (Part of business model)

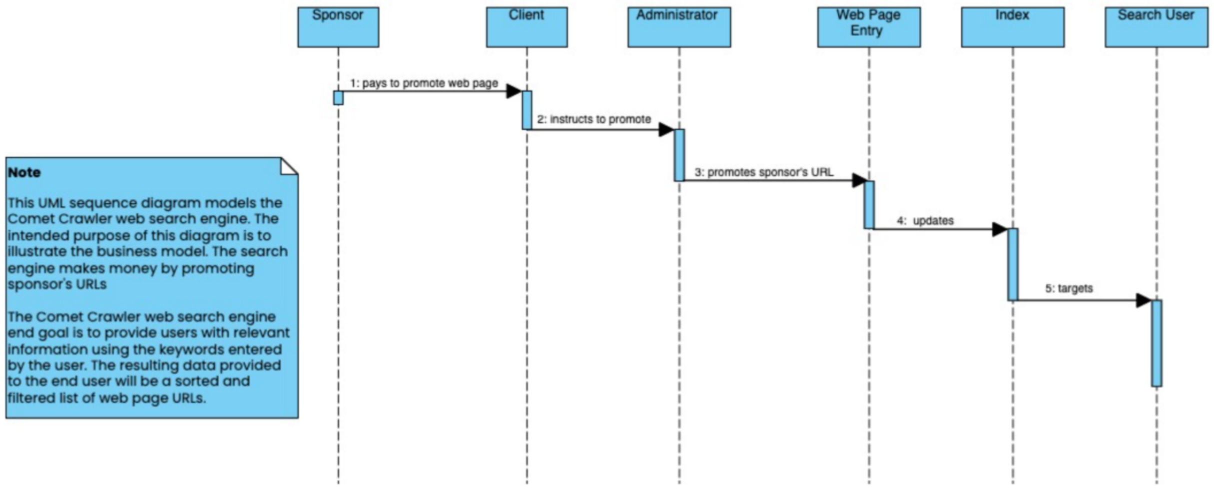


Note

This UML class diagram models the Comet Crawler web search engine. The intended purpose of this diagram is to model the domain. Therefore, this diagram omits functions, databases, clouds, etc. This diagram demonstrates the domain model from the search user's view. Search users are people who have access to the web engine url and enter search queries.

The Comet Crawler web search engine end goal is to provide users with relevant information using the keywords entered by the user. The resulting data provided to the end user will be a sorted and filtered list of web page URLs.

Business Model Sequence Diagram: (Part of business model)

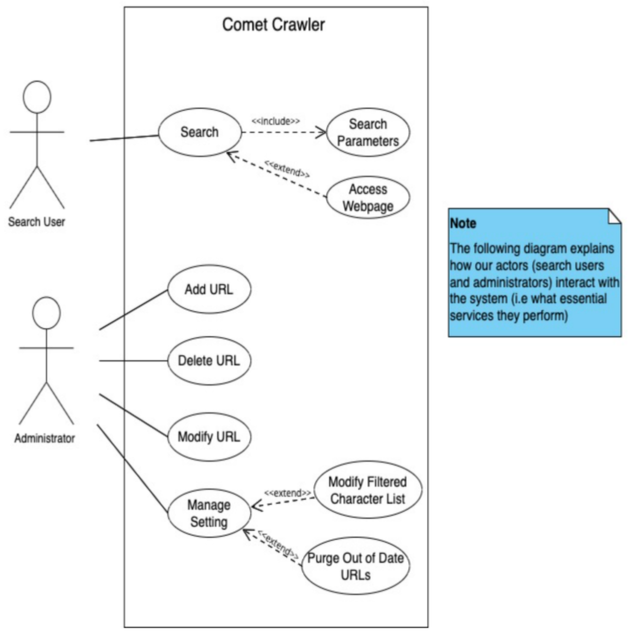


Note

This UML sequence diagram models the Comet Crawler web search engine. The intended purpose of this diagram is to illustrate the business model. The search engine makes money by promoting sponsor's URLs

The Comet Crawler web search engine end goal is to provide users with relevant information using the keywords entered by the user. The resulting data provided to the end user will be a sorted and filtered list of web page URLs.

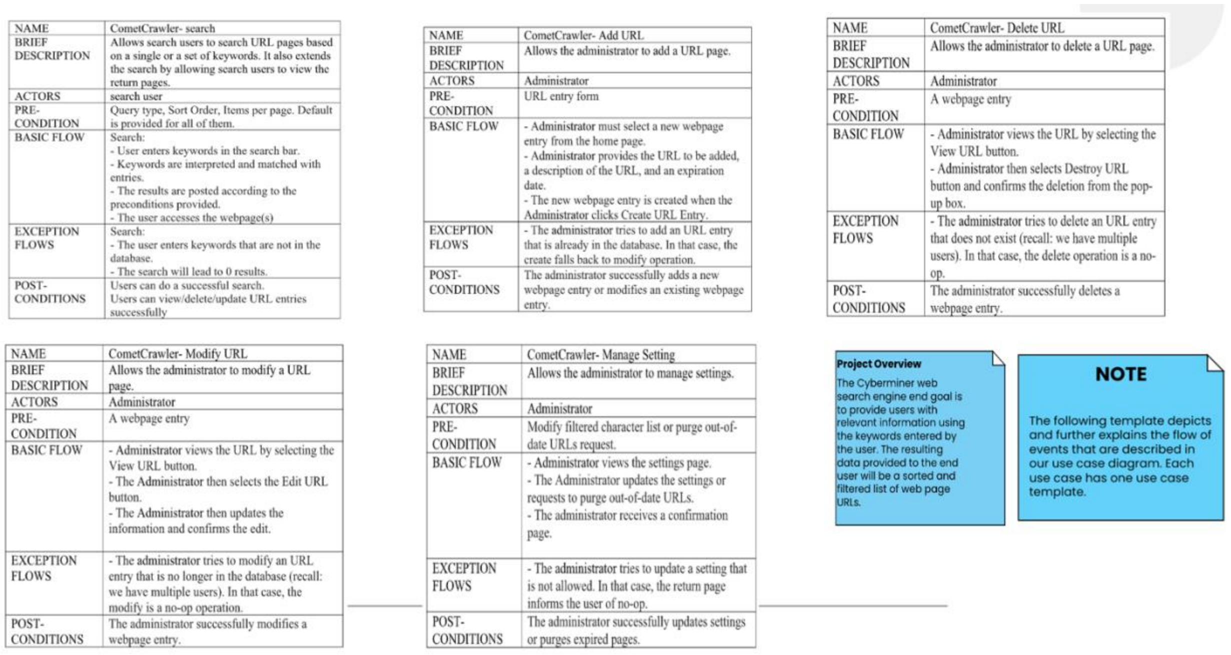
Use Case Diagram: (Part of requirements)



Note

The following diagram explains how our actors (search users and administrators) interact with the system (i.e what essential services they perform)

Use Case Templates: (Part of requirements)



NAME	CometCrawler- search
BRIEF DESCRIPTION	Allows search users to search URL pages based on a single or a set of keywords. It also extends the search by allowing search users to view the return pages.
ACTORS	search user
PRE-CONDITION	Query type, Sort Order, Items per page. Default is provided for all of them.
BASIC FLOW	Search: - User enters keywords in the search bar. - Keywords are interpreted and matched with entries. - The results are posted according to the preconditions provided. - The user accesses the webpage(s)
EXCEPTION FLOWS	Search: - The user enters keywords that are not in the database. - The search will lead to 0 results.
POST-CONDITIONS	Users can do a successful search. Users can view/delete/update URL entries successfully

NAME	CometCrawler- Add URL
BRIEF DESCRIPTION	Allows the administrator to add a URL page.
ACTORS	Administrator
PRE-CONDITION	URL entry form
BASIC FLOW	- Administrator must select a new webpage entry from the home page. - Administrator provides the URL to be added, a description of the URL, and an expiration date. - The new webpage entry is created when the Administrator clicks Create URL Entry.
EXCEPTION FLOWS	- The administrator tries to add an URL entry that is already in the database. In that case, the create falls back to modify operation.
POST-CONDITIONS	The administrator successfully adds a new webpage entry or modifies an existing webpage entry.

NAME	CometCrawler- Delete URL
BRIEF DESCRIPTION	Allows the administrator to delete a URL page.
ACTORS	Administrator
PRE-CONDITION	A webpage entry
BASIC FLOW	- Administrator views the URL by selecting the View URL button. - Administrator then selects Destroy URL button and confirms the deletion from the pop-up box.
EXCEPTION FLOWS	- The administrator tries to delete an URL entry that does not exist (recall: we have multiple users). In that case, the delete operation is a no-op.
POST-CONDITIONS	The administrator successfully deletes a webpage entry.

NAME	CometCrawler- Modify URL
BRIEF DESCRIPTION	Allows the administrator to modify a URL page.
ACTORS	Administrator
PRE-CONDITION	A webpage entry
BASIC FLOW	- Administrator views the URL by selecting the View URL button. - The Administrator then selects the Edit URL button. - The Administrator then updates the information and confirms the edit.
EXCEPTION FLOWS	- The administrator tries to modify an URL entry that is no longer in the database (recall: we have multiple users). In that case, the modify is a no-op operation.
POST-CONDITIONS	The administrator successfully modifies a webpage entry.

NAME	CometCrawler- Manage Setting
BRIEF DESCRIPTION	Allows the administrator to manage settings.
ACTORS	Administrator
PRE-CONDITION	Modify filtered character list or purge out-of-date URLs request.
BASIC FLOW	- Administrator views the settings page. - The Administrator updates the settings or requests to purge out-of-date URLs. - The administrator receives a confirmation page.
EXCEPTION FLOWS	- The administrator tries to update a setting that is not allowed. In that case, the return page informs the user of no-op.
POST-CONDITIONS	The administrator successfully updates settings or purges expired pages.

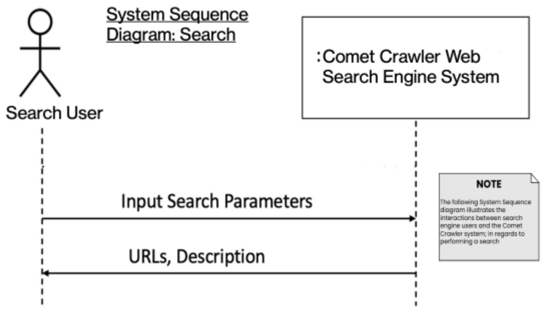
Project Overview

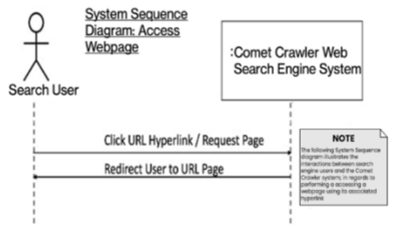
The Cyberminer web search engine end goal is to provide users with relevant information using the keywords entered by the user. The resulting data provided to the end user will be a sorted and filtered list of web page URLs.

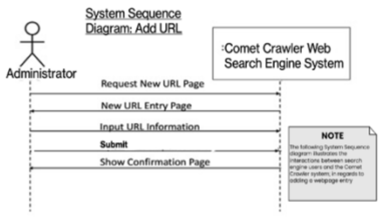
NOTE

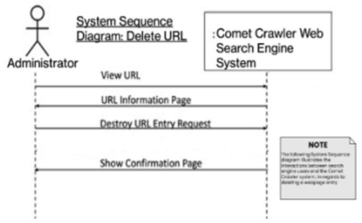
The following template depicts and further explains the flow of events that are described in our use case diagram. Each use case has one use case template.

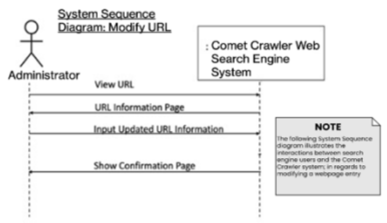
System Sequence Diagrams: (Part of requirements)

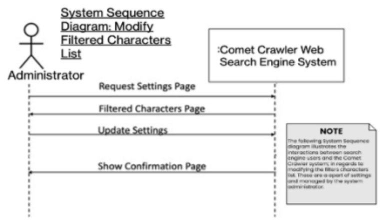

System Sequence Diagram: Search
Search User
:Comet Crawler Web Search Engine System
NOTE
The following System Sequence diagram illustrates the interactions between search engine users and the Comet Crawler system; in regards to performing a search
Input Search Parameters
URLs, Description

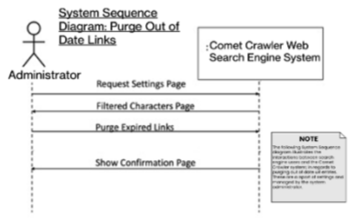

System Sequence Diagram: Access Webpage
Search User
:Comet Crawler Web Search Engine System
Click URL Hyperlink / Request Page
Redirect User to URL Page
NOTE
The following System Sequence diagram illustrates the interactions between search engine users and the Comet Crawler system; in regards to performing a accessing a webpage using its associated hyperlink


System Sequence Diagram: Add URL
Administrator
:Comet Crawler Web Search Engine System
Request New URL Page
New URL Entry Page
Input URL Information
Submit
Show Confirmation Page
NOTE
The following System Sequence diagram illustrates the interactions between search engine users and the Comet Crawler system; in regards to adding a webpage entry


System Sequence Diagram: Delete URL
Administrator
:Comet Crawler Web Search Engine System
View URL
URL Information Page
Destroy URL Entry Request
Show Confirmation Page
NOTE
The following System Sequence diagram illustrates the interactions between search engine users and the Comet Crawler system; in regards to deleting a webpage entry

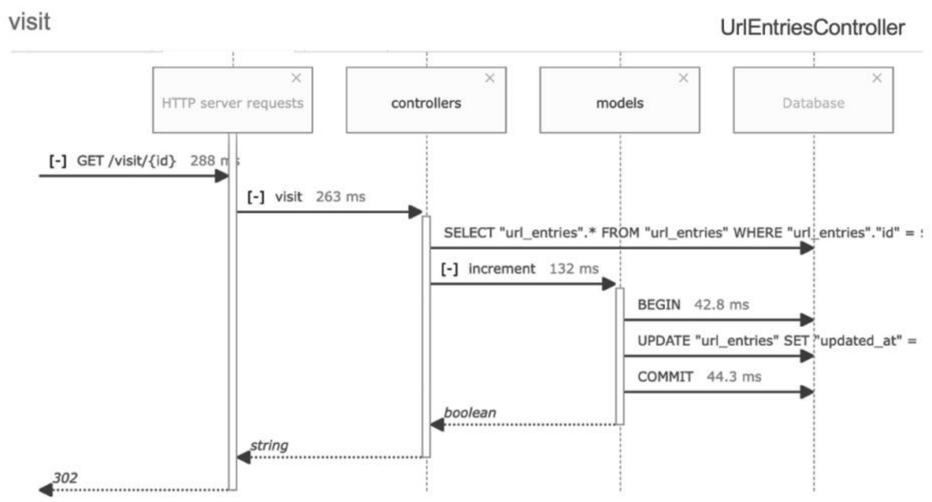

System Sequence Diagram: Modify URL
Administrator
: Comet Crawler Web Search Engine System
View URL
URL Information Page
Input Updated URL Information
Show Confirmation Page
NOTE
The following System Sequence diagram illustrates the interactions between search engine users and the Comet Crawler system; in regards to modifying a webpage entry


System Sequence Diagram: Modify Filtered Characters List
Administrator
:Comet Crawler Web Search Engine System
Request Settings Page
Filtered Characters Page
Update Settings
Show Confirmation Page
NOTE
The following System Sequence diagram illustrates the interactions between search engine users and the Comet Crawler system; in regards to modifying the filters characters list. These are a apart of settings and managed by the system administrator.



Sequence Diagrams: (Part of Design)

URLEntriesController Diagrams

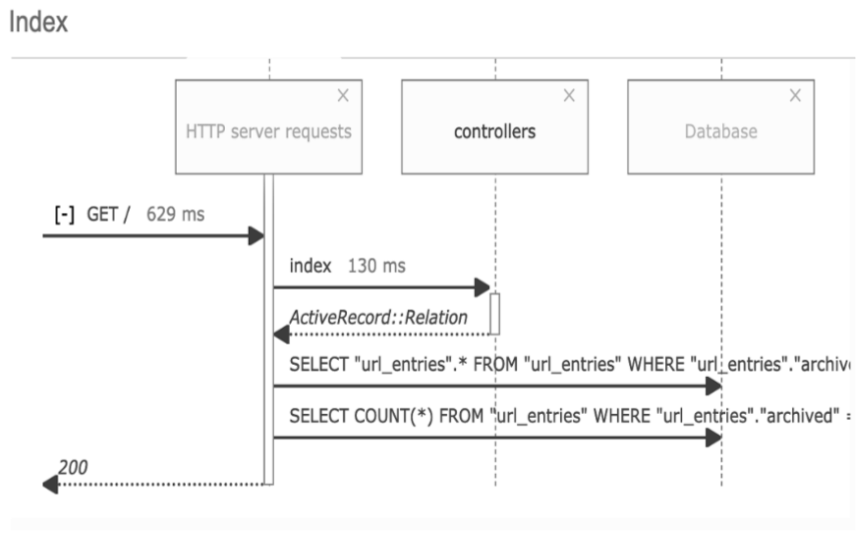


NOTE

The following digram depicts the sequence of events that occur when the visit method in the UrlEntriesController class is invoked. The job of the visit method is to redirect users to their desired web page

```
SELECT "url_entries".* FROM "url_entries" WHERE "url_entries"."id" = $1 LIMIT $2

UPDATE "url_entries" SET "updated_at" = $1, "counter" = $2 WHERE "url_entries"."id" = $3
```


Index
HTTP server requests
controllers
Database
[-] GET / 629 ms
index 130 ms
ActiveRecord::Relation
SELECT "url_entries".* FROM "url_entries" WHERE "url_entries"."archiv
SELECT COUNT(*) FROM "url_entries" WHERE "url_entries"."archived" =
200

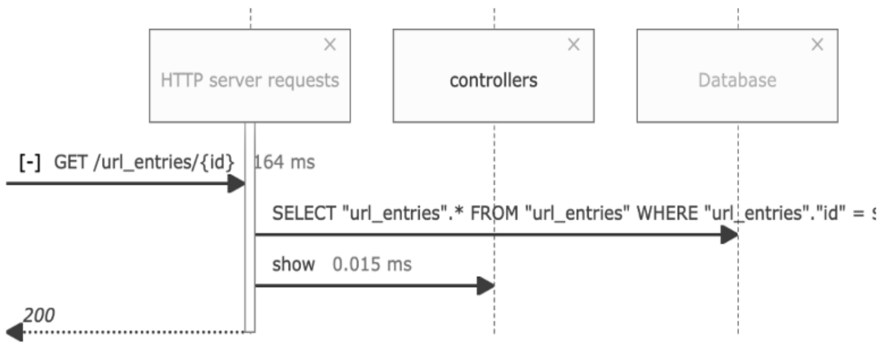
```
SELECT "url_entries".* FROM "url_entries" WHERE "url_entries"."archived" = $1
AND ("url_entries"."sponsored" = $2 OR "url_entries"."sponsored" = $3) ORDER
BY "url_entries"."sponsored" DESC LIMIT $4 OFFSET $5

SELECT COUNT(*) FROM "url_entries" WHERE "url_entries"."archived" = $1 AND
("url_entries"."sponsored" = $2 OR "url_entries"."sponsored" = $3)
```

NOTE

The following digram depicts the sequence of events that occur when the Index method in the UrlEntriesController class is invoked.

show

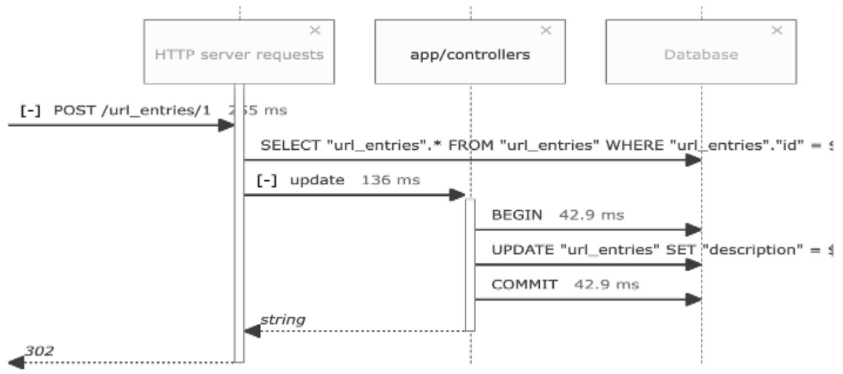

HTTP server requests
controllers
Database
[-] GET /url_entries/{id} 164 ms
SELECT "url_entries".* FROM "url_entries" WHERE "url_entries"."id" = $
show 0.015 ms
200

```
SELECT "url_entries".* FROM "url_entries" WHERE "url_entries"."id" = $1 LIMIT $2
```

NOTE

The following digram depicts the sequence of events that occur when the Show method in the UrlEntriesController class is invoked.

update


HTTP server requests
app/controllers
Database
[-] POST /url_entries/1 255 ms
SELECT "url_entries".* FROM "url_entries" WHERE "url_entries"."id" = $
[-] update 136 ms
BEGIN 42.9 ms
UPDATE "url_entries" SET "description" = $
COMMIT 42.9 ms
string
302

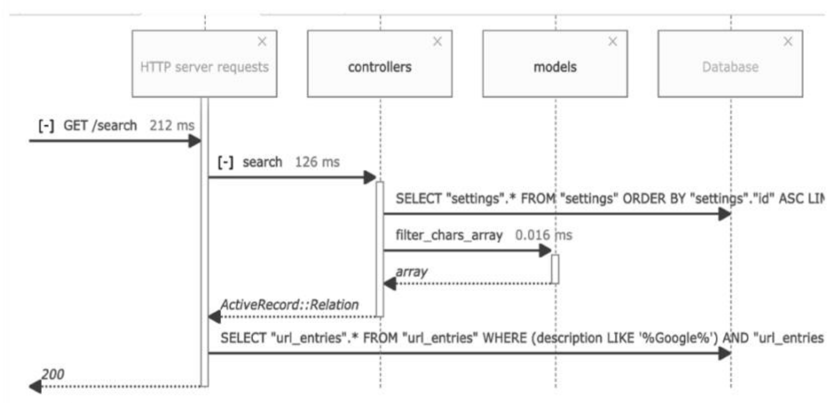
```
SELECT "url_entries".* FROM "url_entries" WHERE "url_entries"."id" = $1 LIMIT $2

UPDATE "url_entries" SET "description" = $1, "updated_at" = $2 WHERE "url_entries"."id"
= $3
```

NOTE

The following digram depicts the sequence of events that occur when the Update method in the UrlEntriesController class is invoked.

search


HTTP server requests
controllers
models
Database
[-] GET /search 212 ms
[-] search 126 ms
SELECT "settings".* FROM "settings" ORDER BY "settings"."id" ASC LIM
filter_chars_array 0.016 ms
array
ActiveRecord::Relation
SELECT "url_entries".* FROM "url_entries" WHERE (description LIKE '%Google%') AND "url_entries
200

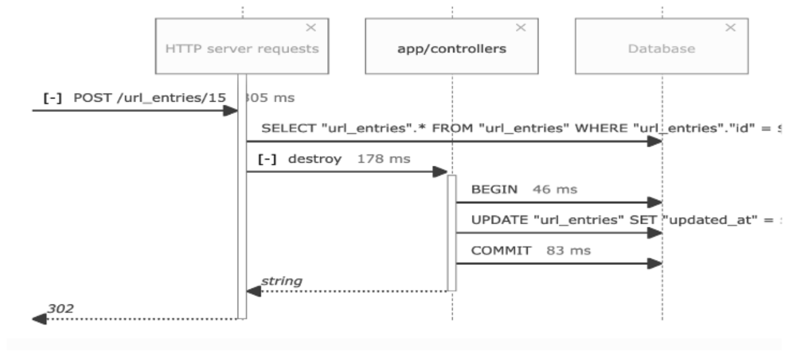
```
SELECT "settings".* FROM "settings" ORDER BY "settings"."id" ASC LIMIT $1

SELECT "url_entries".* FROM "url_entries" WHERE (description LIKE '%%') AND
"url_entries"."archived" = $1 AND ("url_entries"."sponsored" = $2 OR
"url_entries"."sponsored" = $3) ORDER BY "url_entries"."counter" DESC,
"url_entries"."sponsored" DESC LIMIT $4 OFFSET $5
```

NOTE

The following digram depicts the sequence of events that occur when the search method in the UrlEntriesController class is invoked.

destroy

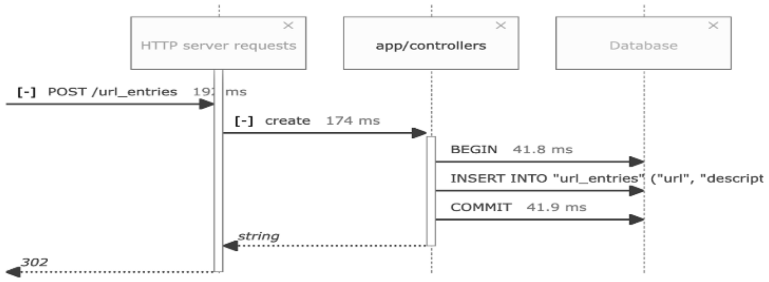

HTTP server requests
app/controllers
Database
[-] POST /url_entries/15 305 ms
SELECT "url_entries".* FROM "url_entries" WHERE "url_entries"."id" = $
[-] destroy 178 ms
BEGIN 46 ms
UPDATE "url_entries" SET "updated_at" =
COMMIT 83 ms
string
302

```
SELECT "url_entries".* FROM "url_entries" WHERE "url_entries"."id" = $1 LIMIT $2
```

NOTE

The following digram depicts the sequence of events that occur when the destroy method in the UrlEntriesController class is invoked.

create



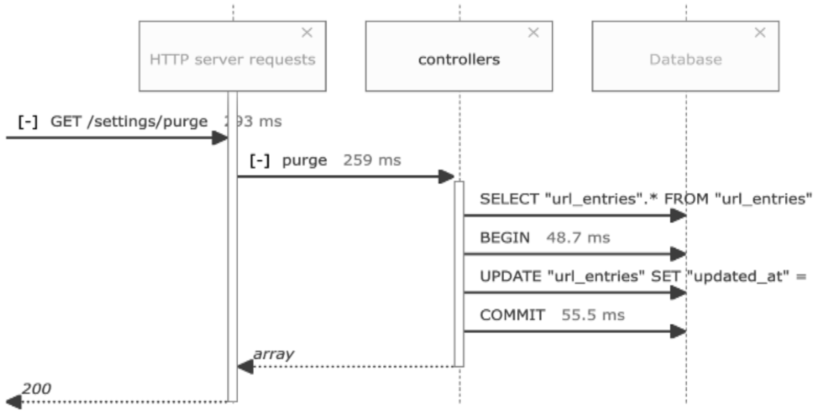
```
INSERT INTO "url_entries" ("url", "description", "expire", "created_at",
"updated_at", "counter", "archived", "sponsored") VALUES ($1, $2, $3, $4, $5, $6,
$7, $8) RETURNING "id"
```

NOTE

The following digram depicts the sequence of events that occur when the create method in the UrlEntriesController class is invoked.

SettingController Diagrams

purge


HTTP server requests
controllers
Database
[-] GET /settings/purge [illegible]93 ms
[-] purge 259 ms
SELECT "url_entries".* FROM "url_entries"
BEGIN 48.7 ms
UPDATE "url_entries" SET "updated_at" =
COMMIT 55.5 ms
array
200

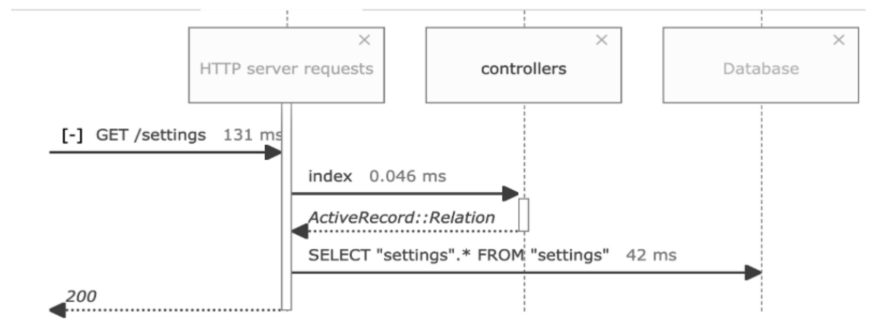
```
SELECT "url_entries".* FROM "url_entries" WHERE "url_entries"."archived" = $1 AND (expire <
'2023-06-07 18:46:55.172212')

UPDATE "url_entries" SET "updated_at" = $1, "archived" = $2 WHERE "url_entries"."id" = $3
```

NOTE

The following digram depicts the sequence of events that occur when the purge method in the SettingController class is invoked.

index

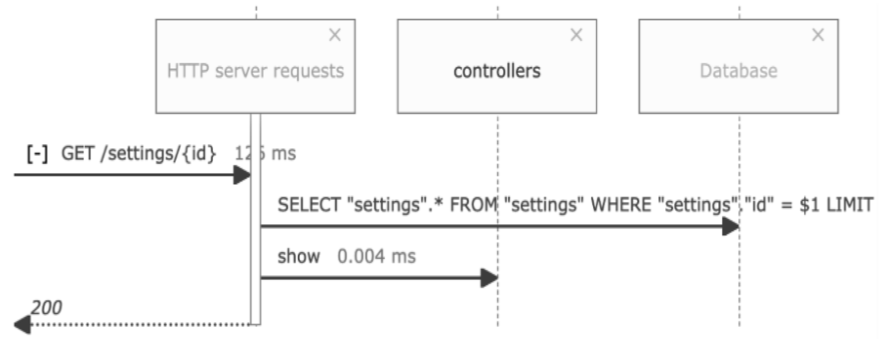


```
SELECT "settings".* FROM "settings"
```

NOTE

The following digram depicts the sequence of events that occur when the index method in the SettingController class is invoked.

show

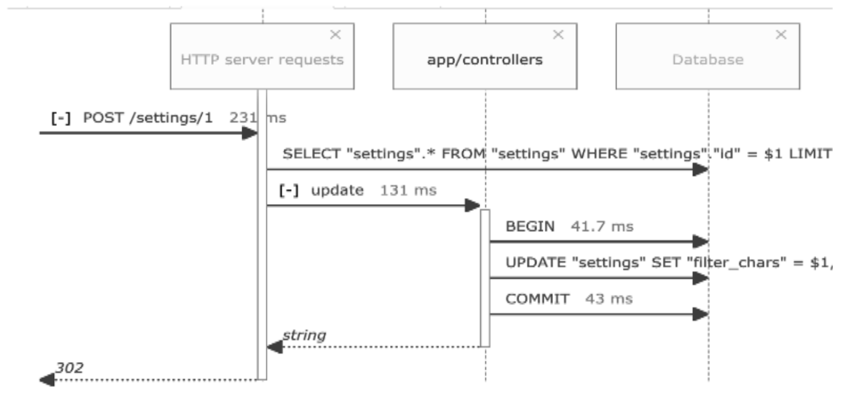

HTTP server requests
controllers
Database
[-] GET /settings/{id} 125 ms
SELECT "settings".* FROM "settings" WHERE "settings"."id" = $1 LIMIT
show 0.004 ms
200

```
SELECT "settings".* FROM "settings" WHERE "settings"."id" = $1 LIMIT $2
```

NOTE

The following digram depicts the sequence of events that occur when the show method in the SettingController class is invoked.

update


HTTP server requests
app/controllers
Database
[-] POST /settings/1 231 ms
SELECT "settings".* FROM "settings" WHERE "settings"."id" = $1 LIMIT
[-] update 131 ms
BEGIN 41.7 ms
UPDATE "settings" SET "filter_chars" = $1,
COMMIT 43 ms
string
302

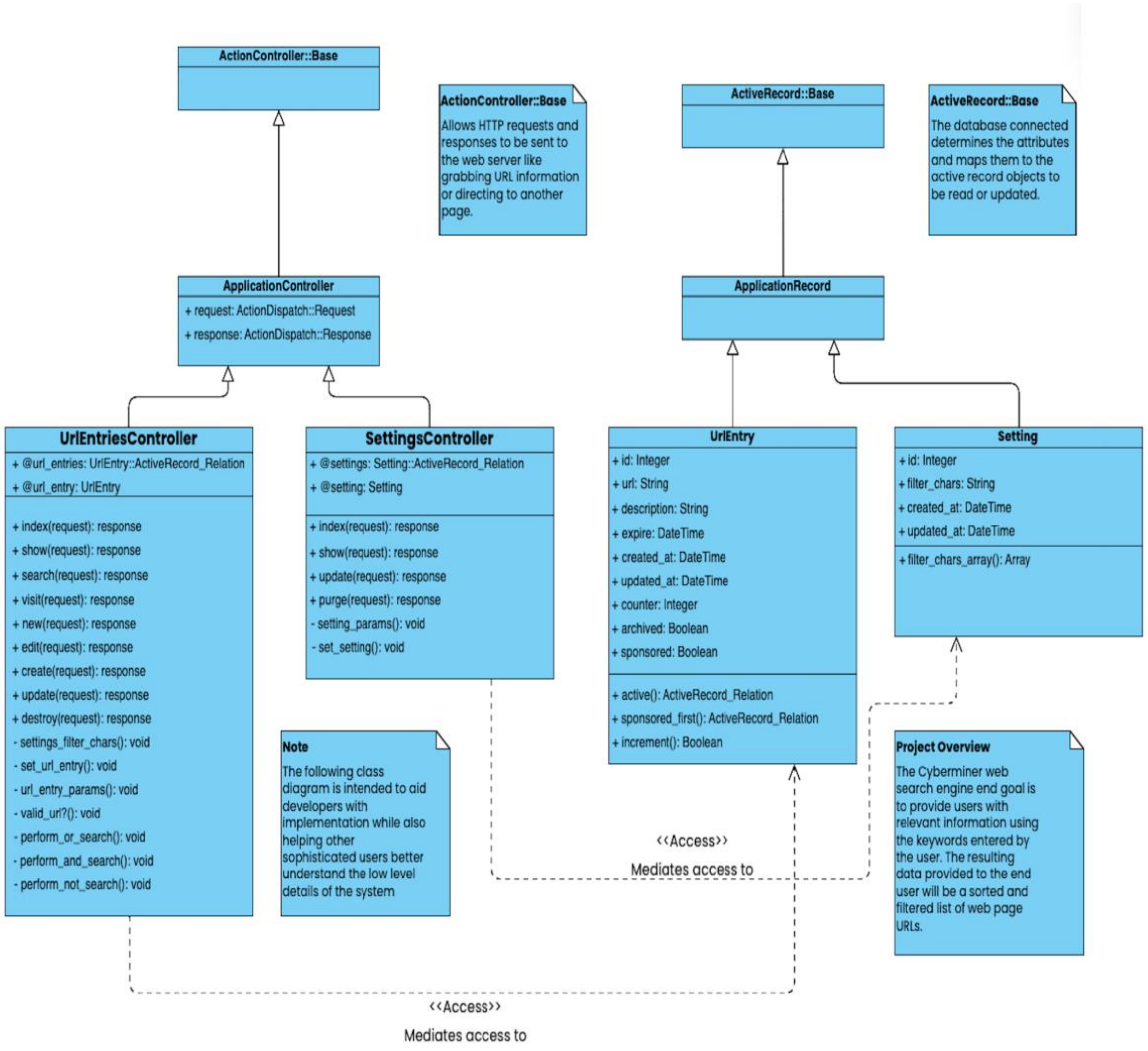
```
SELECT "settings".* FROM "settings" WHERE "settings"."id" = $1 LIMIT $2

UPDATE "settings" SET "filter_chars" = $1, "updated_at" = $2 WHERE
"settings"."id" = $3
```

NOTE

The following digram depicts the sequence of events that occur when the update method in the SettingController class is invoked.

Design Class Diagram (This is a part of Design):


ActionController::Base
ApplicationController
+ request: ActionDispatch::Request
+ response: ActionDispatch::Response
UrlEntriesController
+ @url_entries: UrlEntry::ActiveRecord_Relation
+ @url_entry: UrlEntry
+ index(request): response
+ show(request): response
+ search(request): response
+ visit(request): response
+ new(request): response
+ edit(request): response
+ create(request): response
+ update(request): response
+ destroy(request): response
- settings_filter_chars(): void
- set_url_entry(): void
- url_entry_params(): void
- valid_url?(): void
- perform_or_search(): void
- perform_and_search(): void
- perform_not_search(): void
SettingsController
+ @settings: Setting::ActiveRecord_Relation
+ @setting: Setting
+ index(request): response
+ show(request): response
+ update(request): response
+ purge(request): response
- setting_params(): void
- set_setting(): void
ActiveRecord::Base
ApplicationRecord
UrlEntry
+ id: Integer
+ url: String
+ description: String
+ expire: DateTime
+ created_at: DateTime
+ updated_at: DateTime
+ counter: Integer
+ archived: Boolean
+ sponsored: Boolean
+ active(): ActiveRecord_Relation
+ sponsored_first(): ActiveRecord_Relation
+ increment(): Boolean
Setting
+ id: Integer
+ filter_chars: String
+ created_at: DateTime
+ updated_at: DateTime
+ filter_chars_array(): Array
<<Access>>
Mediates access to
<<Access>>
Mediates access to

ActionController::Base
Allows HTTP requests and responses to be sent to the web server like grabbing URL information or directing to another page.

ActiveRecord::Base
The database connected determines the attributes and maps them to the active record objects to be read or updated.

Note
The following class diagram is intended to aid developers with implementation while also helping other sophisticated users better understand the low level details of the system

Project Overview
The Cyberminer web search engine end goal is to provide users with relevant information using the keywords entered by the user. The resulting data provided to the end user will be a sorted and filtered list of web page URLs.