National Chengchi University

Beat Google

Data Structure - Final Report

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Group 14

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1. Topic

Movies

2. Motivation

When we were discussing the topic of the project, we discovered that all of our members have a common interest: movies. However, we encounter a problem that when we search on Google, the result is not always about films. Hence, we want to create a system that prioritizes websites about movies, so it is easier for film lovers like us to find the websites of our interest.

3. Keywords & Weights

Keywords	Weights	Keywords	Weights	Keywords	Weights
電影	3	客串	1	Oscars	1
影展	2	劇情	1	Golden Horse Awards	1
票房	2	故事	1	GHA	1
二輪戲院	2	movie	3	Golden Lion	1
爛番茄	2	film	3	blockbuster	1
大銀幕	2	cinema	2	soundtrack	1
好萊塢	1	theater	2	director	1
奧斯卡	1	the big screen	2	stars	1
金馬獎	1	IMDB	2	cameo	1
金獅獎	1	rotten tomatoes	2	drama	1
鉅座	1	trailer	2	plot	1
演	1	Hollywood	1	acting	1

Keywords in different categories:

Romance					
Keywords	**Weights**	**Keywords**	**Weights**	**Keywords**	**Weights**
浪漫	15	娶	1	lover	1
愛	15	吻	1	couple	1
情	10	慾望	1	relationship	1
喜歡	10	romance	15	marry	1
戀人	1	romantic	15	marriage	1
兩性	1	affection	10	forever	1
婚	1	love	10	desire	1
嫁	1	sexual	1		

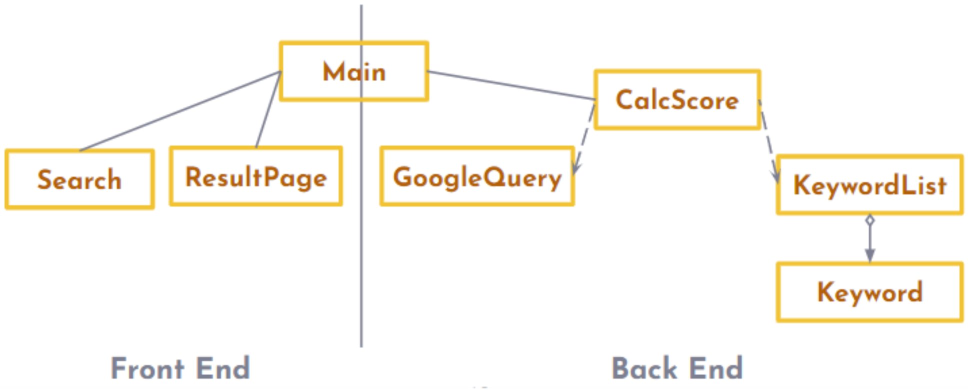
Fantasy					
Keywords	**Weights**	**Keywords**	**Weights**	**Keywords**	**Weights**
奇幻	15	法師	1	time travel	1
科幻	15	巫師	1	robot	1
星際	1	童話	1	monster	1
太空	1	神	1	magic	1
外星	1	鬼	1	power	1
宇宙	1	龍	1	sorcerer	1
地球	1	fantasy	15	imagination	1
時間旅行	1	sci-fi	15	fairy	1
機器	1	science fiction	15	tale	1
妖	1	alien	1	myth	1
怪物	1	space travel	1	god	1
魔	1				

Action					
Keywords	**Weights**	**Keywords**	**Weights**	**Keywords**	**Weights**
動作	15	特技	1	military	1
冒險	15	賽車	1	spy	1
戰爭	1	飛車	1	martial art	1
諜	1	action	15	blast effect	1
武	1	adventure	15	special effect	1
特效	1	war	1		

Comedy					
Keywords	**Weights**	**Keywords**	**Weights**	**Keywords**	**Weights**
喜劇	15	comedy	15	funny	1
笑	1	sitcom	5	hilarious	1
幽默	1	romcom	5	humor	1

Thriller					
Keywords	**Weights**	**Keywords**	**Weights**	**Keywords**	**Weights**
懸疑	15	靈異	1	horror	15
驚悚	15	駭人	1	murder	1
恐怖	15	鬼片	1	detective	1
燒腦	1	顫慄	1	crime	1
推理	1	嚇	1	supernatural	1
謀殺	1	毛骨悚然	1	terrify	1
犯罪	1	thriller	15	horrify	1
殺人	1	suspense	15		

4. Class Diagram



GoogleQuery	fetchContent(String): String fetchGoogle(String): String query(String): HashMap<String, String>
CalcScore	countKeyword(String, String): int calcScore(): HashMap<Integer, ArrayList<String>> sort(HashMap<Integer, ArrayList<String>>): List<Integer>
KeywordList	getKeywordList(): ArrayList<Keyword> filter(String): String movie(): void action(): void romance(); void comedy(): void fantasy(): void thriller(): void

5. Target Users

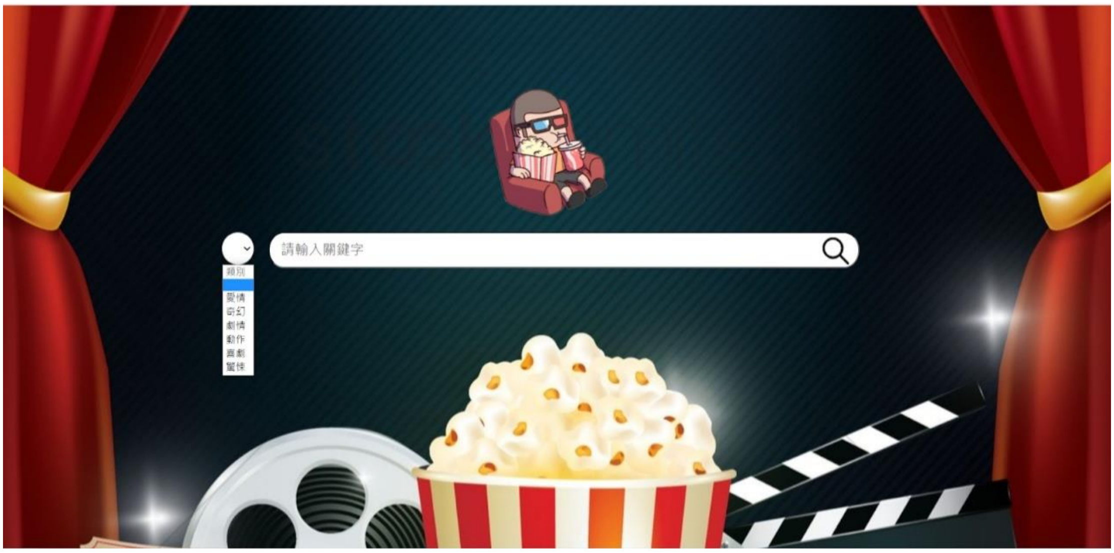
Movie lovers, or simply people who want to search for information related to movies.

6. Purposes of Using the System

We want to filter the results on the Internet and provide information related to movies first, so that users could find these results more easily.

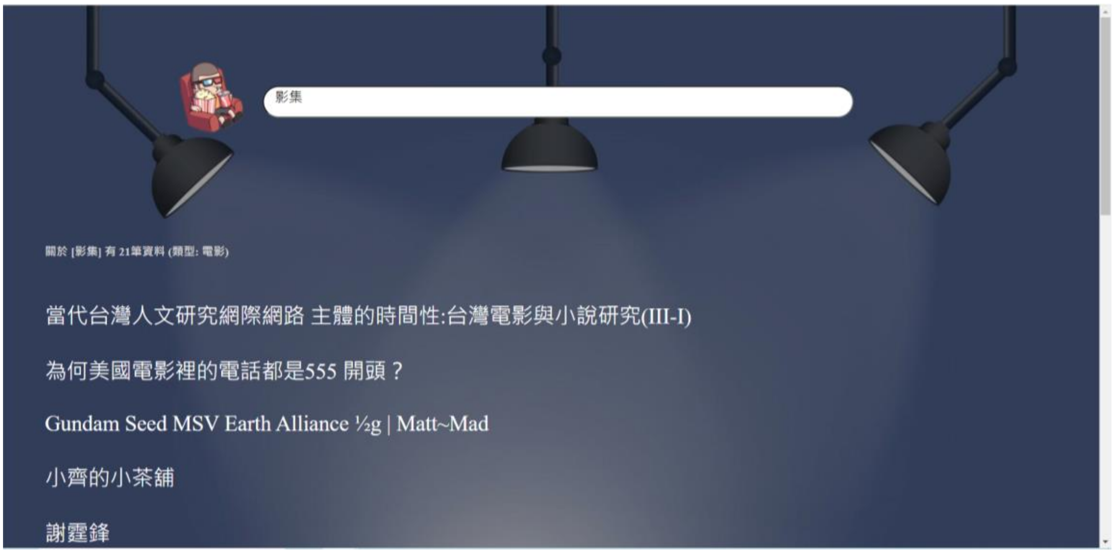
7. System Functions

(1) Several categories to help the system be more accurate; if none of the categories is selected, then the system will just research based on the first set of keywords from 3.



(2) The system automatically calculates the total scores of each website

(3) All the websites are ranked and shown on the result page; the system shows only 30 websites by default



影集

關於 [影集] 有 21筆資料 (類型: 電影)

當代台灣人文研究網際網路 主體的時間性:台灣電影與小說研究(III-I)

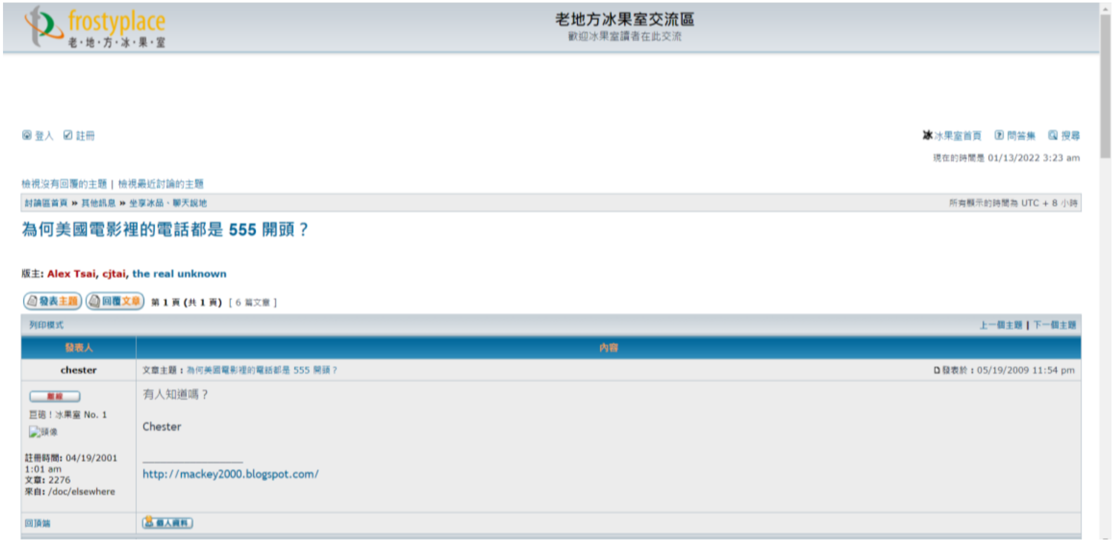
為何美國電影裡的電話都是555 開頭？

Gundam Seed MSV Earth Alliance ½g | Matt~Mad

小齊的小茶舖

謝霆鋒

(4) Click on any link and it will lead to the original website



frostyplace 老·地·方·冰·果·室

老地方冰果室交流區

歡迎冰果室讀者在此交流

現在的時間是 01/13/2022 3:23 am

檢視沒有回覆的主題 | 檢視最近討論的主題

討論區首頁 » 其他訊息 » 坐享冰品．聊天說地

所有顯示的時間為 UTC + 8 小時

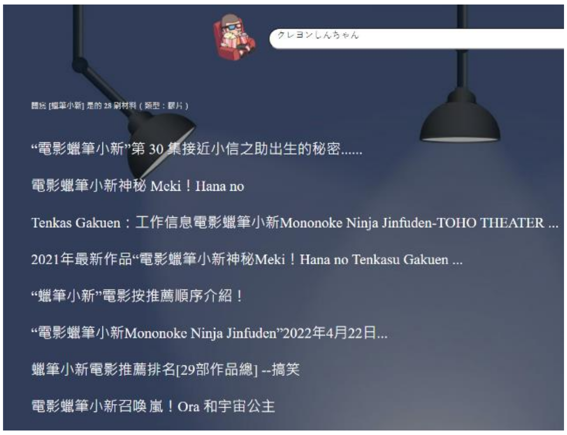
為何美國電影裡的電話都是 555 開頭？

版主: Alex Tsai, cjtai, the real unknown

第 1 頁 (共 1 頁) [6 篇文章]

發表人	內容
chester	文章主題：為何美國電影裡的電話都是 555 開頭？ 發表於：05/19/2009 11:54 pm
巨砲！冰果室 No. 1 註冊時間: 04/19/2001 1:01 am 文章: 2276 來自: /doc/elsewhere	有人知道嗎？ Chester http://mackey2000.blogspot.com/
回頂端	個人資料

(5) Besides Chinese and English, the system also supports Japanese, and Korean



クレヨンしんちゃん

關於 [蠟筆小新] 是的 28 刷材料 (類型：影片)

“電影蠟筆小新”第 30 集接近小信之助出生的秘密......

電影蠟筆小新神秘 Meki！Hana no

Tenkas Gakuen：工作信息電影蠟筆小新Mononoke Ninja Jinfuden-TOHO THEATER ...

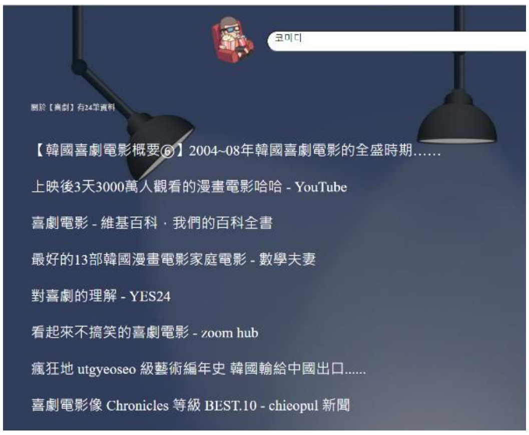
2021年最新作品“電影蠟筆小新神秘Meki！Hana no Tenkasu Gakuen ...

“蠟筆小新”電影按推薦順序介紹！

“電影蠟筆小新Mononoke Ninja Jinfuden”2022年4月22日...

蠟筆小新電影推薦排名[29部作品總] --搞笑

電影蠟筆小新召喚 嵐！Ora 和宇宙公主



코미디

關於【喜劇】有24筆資料

【韓國喜劇電影概要⑥】2004~08年韓國喜劇電影的全盛時期......

上映後3天3000萬人觀看的漫畫電影哈哈 - YouTube

喜劇電影 - 維基百科，我們的百科全書

最好的13部韓國漫畫電影家庭電影 - 數學夫妻

對喜劇的理解 - YES24

看起來不搞笑的喜劇電影 - zoom hub

瘋狂地 utgyeoseo 級藝術編年史 韓國輸給中國出口......

喜劇電影像 Chronicles 等級 BEST.10 - chicopul 新聞

8. How to Use

(1) Type keywords in the search bar

(2) Choose which category; if not chosen, the system will just show results about movies, regardless of categories

(3) Click the “search” button

(4) Click the icon on the left of the search bar to go back to the main page

9. Test Plans

(1) Walk-through

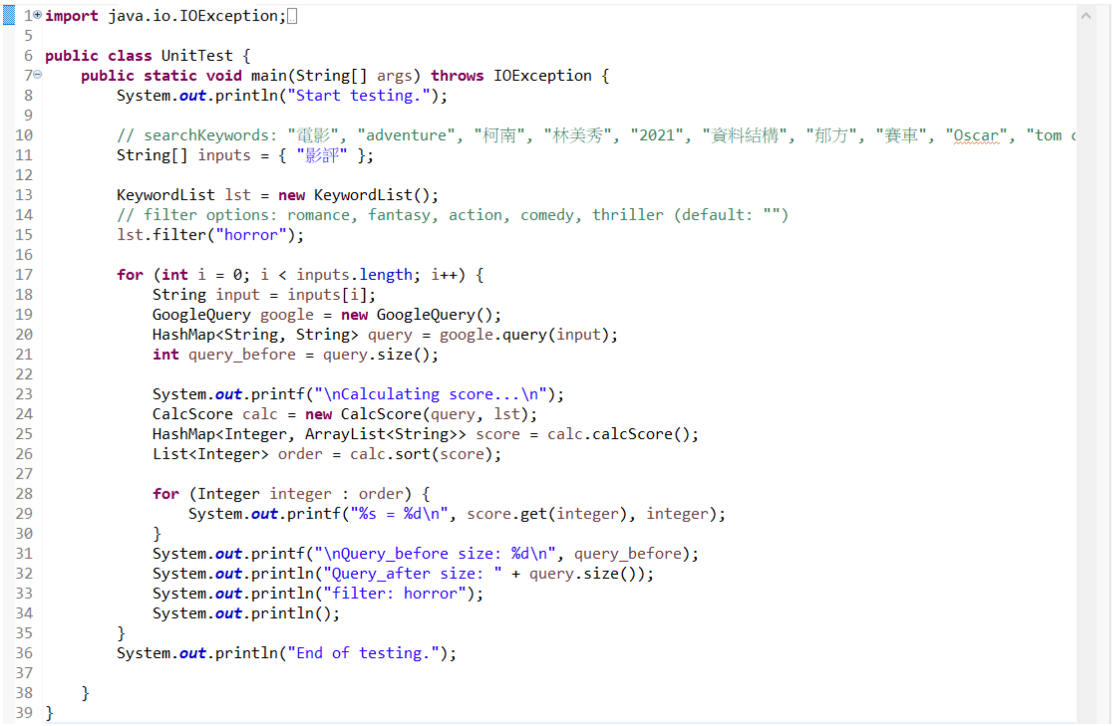
(2) Desk checking

(3) Unit testing

(4) Integration testing

(5) Performance test

(6) Alpha test



```
import java.io.IOException;

public class UnitTest {
    public static void main(String[] args) throws IOException {
        System.out.println("Start testing.");

        // searchKeywords: "電影", "adventure", "柯南", "林美秀", "2021", "資料結構", "郁方", "賽車", "Oscar", "tom c
        String[] inputs = { "影評" };

        KeywordList lst = new KeywordList();
        // filter options: romance, fantasy, action, comedy, thriller (default: "")
        lst.filter("horror");

        for (int i = 0; i < inputs.length; i++) {
            String input = inputs[i];
            GoogleQuery google = new GoogleQuery();
            HashMap<String, String> query = google.query(input);
            int query_before = query.size();

            System.out.printf("\nCalculating score...\n");
            CalcScore calc = new CalcScore(query, lst);
            HashMap<Integer, ArrayList<String>> score = calc.calcScore();
            List<Integer> order = calc.sort(score);

            for (Integer integer : order) {
                System.out.printf("%s = %d\n", score.get(integer), integer);
            }
            System.out.printf("\nQuery_before size: %d\n", query_before);
            System.out.println("Query_after size: " + query.size());
            System.out.println("filter: horror");
            System.out.println();
        }
        System.out.println("End of testing.");

    }
}
```

This is the class we wrote for unit testing in the first place; after testing every class one by one, we update the code and turn it into a class for integration testing.

Since it runs in Eclipse and doesn’t need to connect to Tomcat, it would be easier for us when testing; anything wrong would be shown on the console, which helps us figure out where the problem is and how to fix it.

10. Schedule

Project initiation	10/18							
Structure design		10/29~ 11/15						
Back end coding			12/25~ 1/1					
Front end coding				1/2~ 1/10				
Testing & debug					1/6~ 1/10			
Report						1/6~ 1/11		
Presentation preparation							1/12~ 1/13	
Demo								1/13

11. Work Distribution

徐嘉妤	Page rank Site rank	莊喻絜	Web page
林怡蕙	Call Google Related keywords Presentation & Demo	葉於芊	PPT Final report

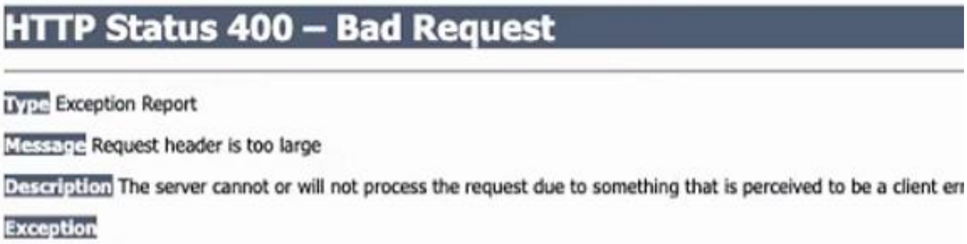
12. Problems Encountered & Solutions

(1) Don’t know how to connect front end with backend

(2) Don’t know how to convert the final result into a webpage

(3) Results are not necessarily ranked according to the given category

(4) Servlet response 400/403/404 bad request



HTTP Status 400 – Bad Request

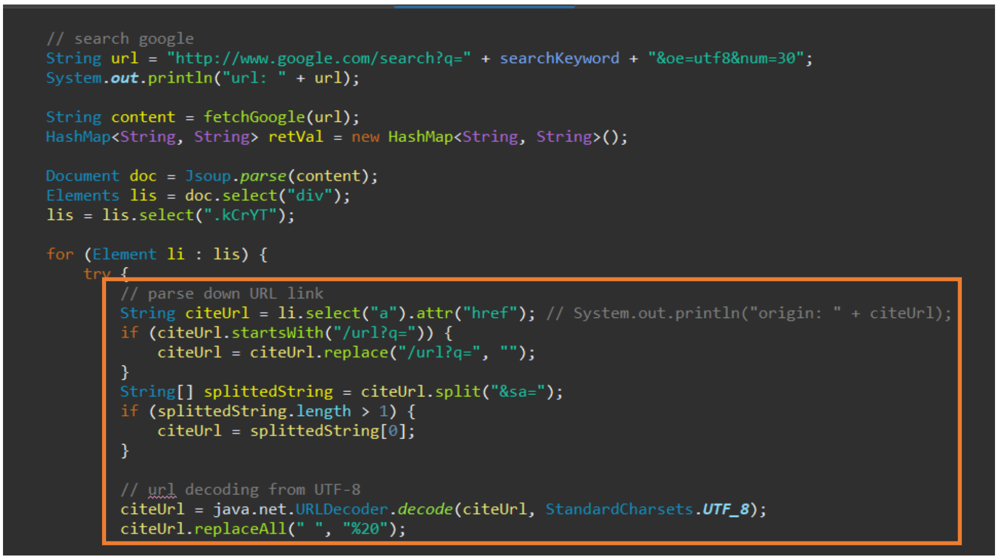
Type Exception Report

Message Request header is too large

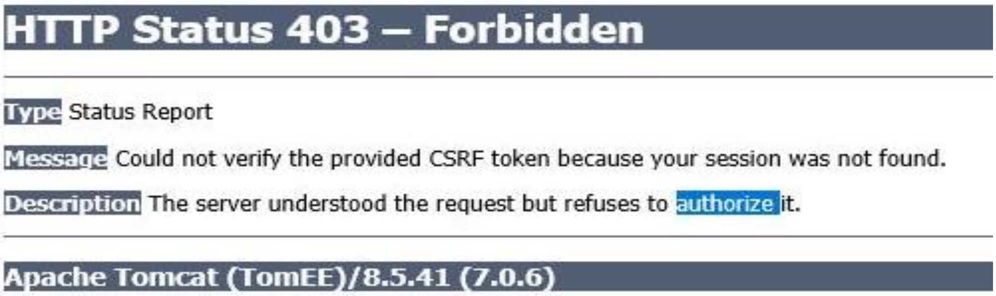
Description The server cannot or will not process the request due to something that is perceived to be a client err

Exception

Solutions:



```
// search google
String url = "http://www.google.com/search?q=" + searchKeyword + "&oe=utf8&num=30";
System.out.println("url: " + url);

String content = fetchGoogle(url);
HashMap<String, String> retVal = new HashMap<String, String>();

Document doc = Jsoup.parse(content);
Elements lis = doc.select("div");
lis = lis.select(".kCrYT");

for (Element li : lis) {
    try {
        // parse down URL link
        String citeUrl = li.select("a").attr("href"); // System.out.println("origin: " + citeUrl);
        if (citeUrl.startsWith("/url?q=")) {
            citeUrl = citeUrl.replace("/url?q=", "");
        }
        String[] splittedString = citeUrl.split("&sa=");
        if (splittedString.length > 1) {
            citeUrl = splittedString[0];
        }

        // url decoding from UTF-8
        citeUrl = java.net.URLDecoder.decode(citeUrl, StandardCharsets.UTF_8);
        citeUrl.replaceAll(" ", "%20");
```



HTTP Status 403 – Forbidden

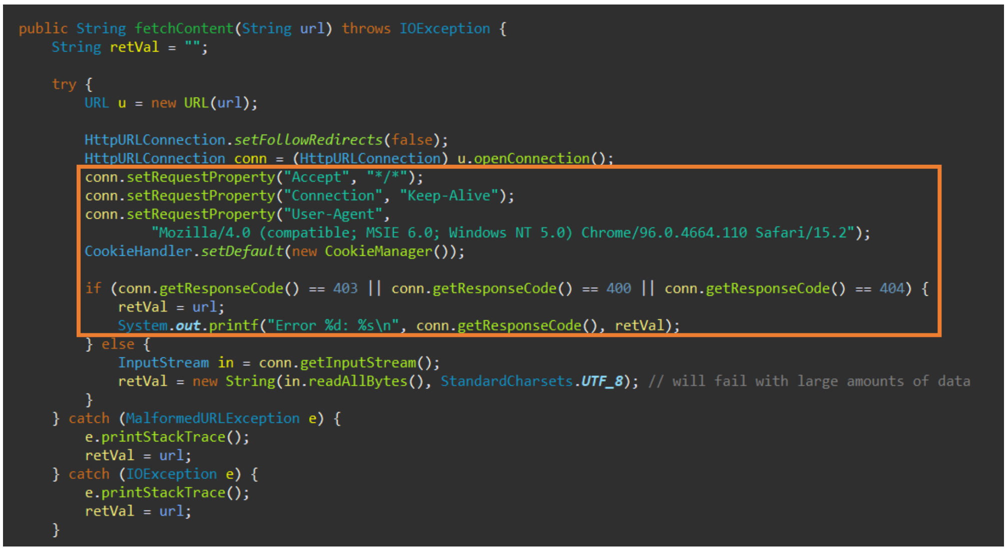
Type Status Report

Message Could not verify the provided CSRF token because your session was not found.

Description The server understood the request but refuses to authorize it.

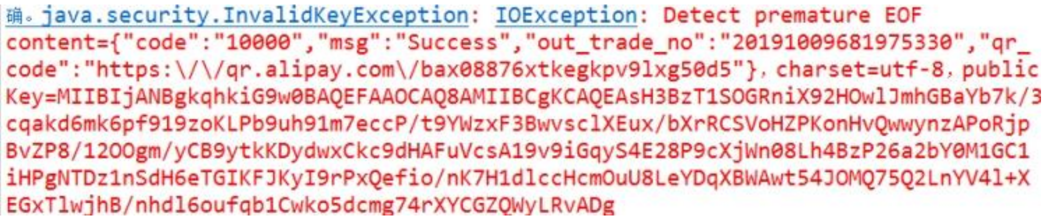
Apache Tomcat (TomEE)/8.5.41 (7.0.6)

Solutions:



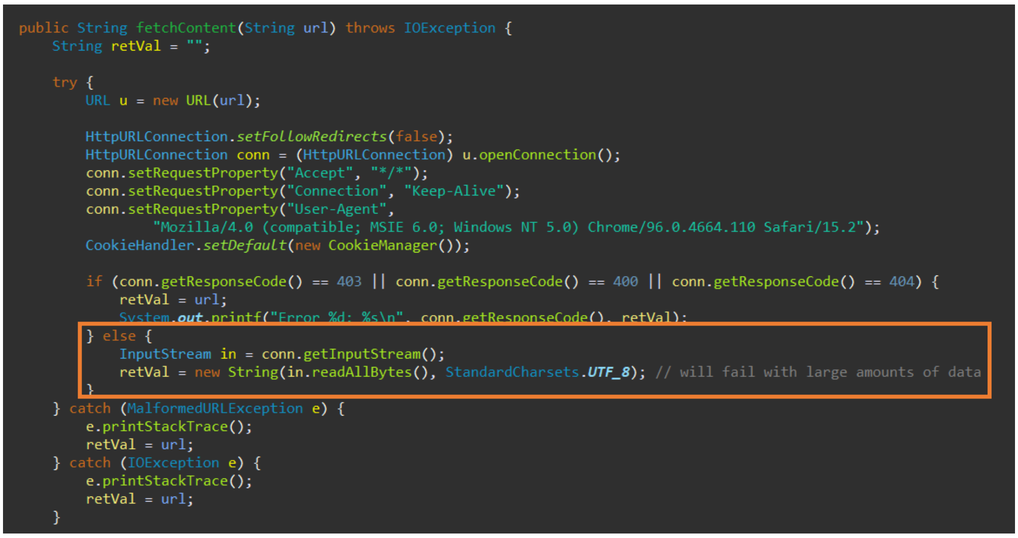
```
public String fetchContent(String url) throws IOException {
    String retVal = "";

    try {
        URL u = new URL(url);

        HttpURLConnection.setFollowRedirects(false);
        HttpURLConnection conn = (HttpURLConnection) u.openConnection();
        conn.setRequestProperty("Accept", "*/*");
        conn.setRequestProperty("Connection", "Keep-Alive");
        conn.setRequestProperty("User-Agent",
                "Mozilla/4.0 (compatible; MSIE 6.0; Windows NT 5.0) Chrome/96.0.4664.110 Safari/15.2");
        CookieHandler.setDefault(new CookieManager());

        if (conn.getResponseCode() == 403 || conn.getResponseCode() == 400 || conn.getResponseCode() == 404) {
            retVal = url;
            System.out.printf("Error %d: %s\n", conn.getResponseCode(), retVal);
        } else {
            InputStream in = conn.getInputStream();
            retVal = new String(in.readAllBytes(), StandardCharsets.UTF_8); // will fail with large amounts of data
        }
    } catch (MalformedURLException e) {
        e.printStackTrace();
        retVal = url;
    } catch (IOException e) {
        e.printStackTrace();
        retVal = url;
    }
```

(5) Java.IO.Exception Premature EOF



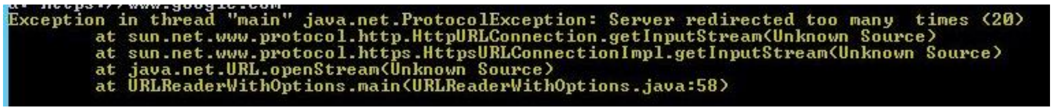
```
碉。java.security.InvalidKeyException: IOException: Detect premature EOF
content={"code":"10000","msg":"Success","out_trade_no":"20191009681975330","qr_
code":"https:\/\/qr.alipay.com\/bax08876xtkegkpv9lxg50d5"}, charset=utf-8, public
Key=MIIBIjANBgkqhkiG9w0BAQEFAAOCAQ8AMIIBCgKCAQEAsH3BzT1SOGRniX92HOwlJmhGBaYb7k/3
cqakd6mk6pf919zoKLPb9uh91m7eccP/t9YWzxF3BwvsclXEux/bXrRCSVoHZPKonHvQwwynzAPoRjp
BvZP8/12O0gm/yCB9ytkKDydwxCkc9dHAFuVcsA19v9iGqyS4E28P9cXjWn08Lh4BzP26a2bY0M1GC1
iHPgNTDz1nSdH6eTGIKFJKyI9rPxQefio/nK7H1dlccHcmOuU8LeYDqXBWAwt54JOMQ75Q2LnYV4l+X
EGxTlwjhB/nhdl6oufqb1Cwko5dcmg74rXYCGZQWyLRvADg
```

Solutions:



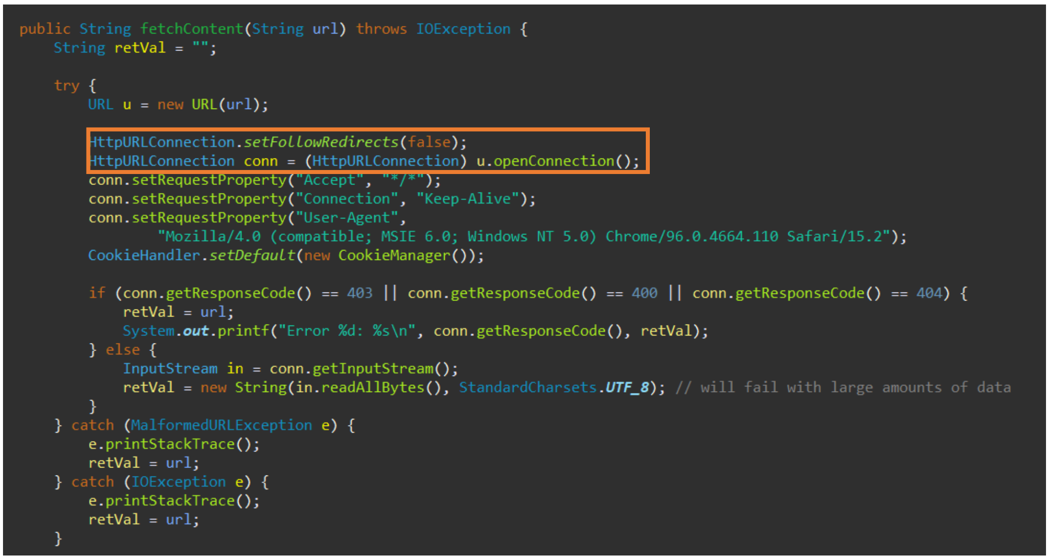
```java
public String fetchContent(String url) throws IOException {
    String retVal = "";

    try {
        URL u = new URL(url);

        HttpURLConnection.setFollowRedirects(false);
        HttpURLConnection conn = (HttpURLConnection) u.openConnection();
        conn.setRequestProperty("Accept", "*/*");
        conn.setRequestProperty("Connection", "Keep-Alive");
        conn.setRequestProperty("User-Agent",
                "Mozilla/4.0 (compatible; MSIE 6.0; Windows NT 5.0) Chrome/96.0.4664.110 Safari/15.2");
        CookieHandler.setDefault(new CookieManager());

        if (conn.getResponseCode() == 403 || conn.getResponseCode() == 400 || conn.getResponseCode() == 404) {
            retVal = url;
            System.out.printf("Error %d: %s\n", conn.getResponseCode(), retVal);
        } else {
            InputStream in = conn.getInputStream();
            retVal = new String(in.readAllBytes(), StandardCharsets.UTF_8); // will fail with large amounts of data
        }
    } catch (MalformedURLException e) {
        e.printStackTrace();
        retVal = url;
    } catch (IOException e) {
        e.printStackTrace();
        retVal = url;
    }
```

(6) Server redirected too many times (20)



```
at https://www.google.com
Exception in thread "main" java.net.ProtocolException: Server redirected too many  times (20)
        at sun.net.www.protocol.http.HttpURLConnection.getInputStream(Unknown Source)
        at sun.net.www.protocol.https.HttpsURLConnectionImpl.getInputStream(Unknown Source)
        at java.net.URL.openStream(Unknown Source)
        at URLReaderWithOptions.main(URLReaderWithOptions.java:58)
```

Solutions:



```java
public String fetchContent(String url) throws IOException {
    String retVal = "";

    try {
        URL u = new URL(url);

        HttpURLConnection.setFollowRedirects(false);
        HttpURLConnection conn = (HttpURLConnection) u.openConnection();
        conn.setRequestProperty("Accept", "*/*");
        conn.setRequestProperty("Connection", "Keep-Alive");
        conn.setRequestProperty("User-Agent",
                "Mozilla/4.0 (compatible; MSIE 6.0; Windows NT 5.0) Chrome/96.0.4664.110 Safari/15.2");
        CookieHandler.setDefault(new CookieManager());

        if (conn.getResponseCode() == 403 || conn.getResponseCode() == 400 || conn.getResponseCode() == 404) {
            retVal = url;
            System.out.printf("Error %d: %s\n", conn.getResponseCode(), retVal);
        } else {
            InputStream in = conn.getInputStream();
            retVal = new String(in.readAllBytes(), StandardCharsets.UTF_8); // will fail with large amounts of data
        }
    } catch (MalformedURLException e) {
        e.printStackTrace();
        retVal = url;
    } catch (IOException e) {
        e.printStackTrace();
        retVal = url;
    }
```

13. Expectations for Future Development

(1) Include more keywords to be more accurate

(2) Add more categories to meet the needs of every user

(3) Be able to search for other types besides movies, such as TV series

(4) Support all languages, especially those that are very similar to English and may confuse the system, such as Spanish

14. GitHub Link

https://github.com/109306064/final