The Website for Lost and Found

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***Abstract*—We built a small website for "Lost and Found", students can post information or collect information on this website, which makes it easier to find what they have lost and return what they found.**

The application can be run online at http://129.213.59.176:8080/BBS

Github: git@github.com:FlyerZheng/COMSM0010.git

***Index Terms*—Lost and Found, JSP, Oracle Cloud, MySQL**

I. Introduction

In university, students have lots of precious things such as ID card, phones and credit card. If we lost these things, it is hard to live a normal life in this highly informative society. At the mean time, it's hard for us to find things we lost by ourselves, even if we can achieve this, it is completely inefficient, for the reason that the information we can get is limited.

Let us give an example. Last time when I went to Bath, I lost my s sunglasses at the train station. When I realized it, I have left Bath and arrived Bristol. I tried to ask the staff of Lost and Found in Bristol staton that whether they can help me find my lost item, and they answered that I can get my sunglasses back only if I returned to Bath. It's a totally waste of my time and money.

But things will go different if we have a platform to post what we lost and ask for help. I can confirm where my sunglasses are with the help of kindful people, instead of spending a lot of futile efforts to find it. On the other hand, those people who find something lost do not have to worry about how to find the owners. They can simply post what they find on the website, once the owners log in our website, they will see.

This website is built for these kind of situations. We offered this platform for students in University of Bristol, which is easy to handle.This website realize centralized loss of property claiming.

II. Motivation for the usage of cloud computing

A. What is Cloud Computing?

Cloud computing is a model for implementing ubiquitous, convenient on-demand network access to shared pools of configurable computing resources (eg, networks, servers, storage, applications, and services) that can be minimized Manage work quickly to configure and publish, or service provider interaction. [1]

Cloud Computing is, simply and popularly, using hundreds of machines simultaneously which provide hundreds of CPU time to complete one work and each machine focuses on an independent part of the work.

B. What are the benefits of cloud computing

Cloud computing has three main benefits: flexibility, efficiency, and strategic value. Users can connect to the extended service over the Internet to meet their needs, customize applications and access cloud services from anywhere. Furthermore, enterprise users can quickly bring applications to market without worrying about the underlying infrastructure costs or maintenance. Also, cloud services provide enterprises with a competitive advantage by providing the most innovative technologies.

C. How does cloud computing help our website?

As a small website, we don't neccessarily need a cloud infrustructure. But if we want to enlarge our website, it is useful and more efficient to have a scalable server. So cloud computing can help us achieve this goal. Moreover, if we choose to run the website on a small server, it would cost more than run on the cloud.

III. Functional demand analysis

With the increasing complexity of software systems and the expansion of scale, demand analysis has become more prominent in software development. The so-called demand refers to the user's requirements on the target software system in terms of function, behavior, performance design constraints. In the research of demand analysis, system developers must investigate and analyze the needs of users, and correctly define the characteristics of target software based on the characteristics of the actual environment. Therefore, demand analysis is critical.

A. Administrator function

As administrator of the website, he can manipulate posts, modifying or deleting them.

B. User function

Students can register as users. Users can post to find what they lost or return what they found.

C. Visitor function

If students don't want to register, they can visit the website as visitor. Visitors also can look up posts and post a new one.

IV. Key technologies

In this section, we describe the key technologies we used to make it. As we said above, we defined three main characters of our website: administrators, users, and visitors. They are also seen as the main functional parts. Apart from this, we also considered about the security. Because the website was built on the cloud, the security was one of the main problem we need to consider.

We used the following technologies:

A. Java

The Java platform consists of a Java Virtual Machine and a Java Application Programming Interface (API). The Java application programming interface provides a standard interface independent of the operating system for Java applications, which can be divided into basic parts and extension parts. After installing a Java platform on a hardware or operating system platform, the Java application can run.

The birth of Java is a challenge to the traditional computer model, which has a profound impact on computer software development and the software industry

B. MySQL

The database uses the MySQL open source database.

MySQL application: compared with other large databases such as Oracle, DB2, SQL Server, etc., MySQL has its own shortcomings, such as small size, limited functionality (MySQL Cluster's function and efficiency are relatively poor), etc., but This has not reduced its popularity. For the average individual user and small and medium-sized enterprises, MySQL provides more than enough functionality, and because MySQL is open source software, it can greatly reduce the overall cost.

C. JSP

JSP (JavaServer Pages) is a dynamic web technology standard created by Sun Microsystems. The JSP is deployed on the web server and can respond to requests sent by the client and dynamically generate web pages of HTML, XML or other format documents according to the requested content, and then return to the requester. JSP technology uses the Java language as a scripting language to serve users' HTTP requests and to handle complex business requirements with other Java programs on the server.

JSP can easily and efficiently add dynamic web content in a templated way.Also, JSP inherits the relative ease of use of the Java language and the cross-platform advantages of Java. [2]

D. Oracle Cloud

Oracle Cloud provides Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service (SaaS) and Data as a Service (DaaS). These services are used to build, deploy, integrate, and scale applications in the cloud. The platform supports numerous open standards (SQL, HTML5, REST, etc.), open source solutions (Kubernetes, Hadoop, Kafka, etc.), as well as a variety of programming languages, databases, tools and frameworks, including Oracle-specific, open source, third-party software and system. [3] [4]

V. Implementation

A. Database connection implementation

This website uses the connection method of JDBC database. JDBC (Java Data Base Connectivity) is a Java API for executing SQL statements, which can provide unified access to multiple relational databases. It is written by a group of Java languages. The class and interface are composed. JDBC provides a standard API for tool/database developers to build more advanced tools and interfaces that enable database developers to write database applications using pure Java APIs.

B. Function module implementation

1) Login: Administrator can log in to manipulate the website, he can modify or delete posts and reply. Also, students can use the website as visitors, they can post and reply.

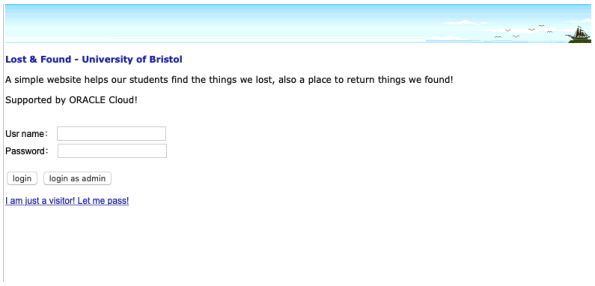

Fig. 1. login

C. Page implementation

1) Home page: When students login or visit the website, Home page is the first page they reach. Students can look up to all posts of lost and found and reply. Posts are arranged by time order. They also can search for specified item by inputing what they want to find in the box and click the search button.

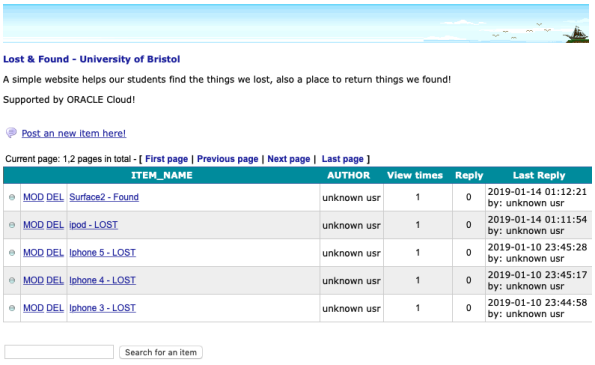

Fig. 2. post

2) Post page: Students can post, finding loss proporty or finding the owner are distinguished with the label "Lost" and "Found"

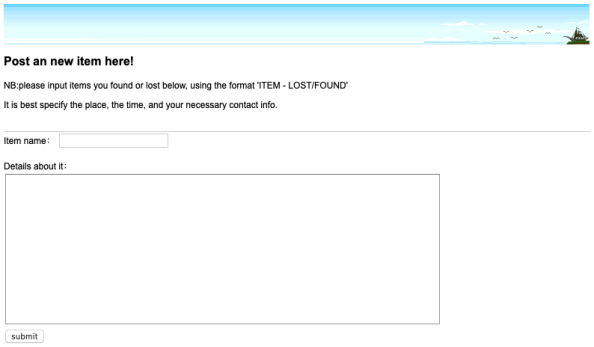

Fig. 3. post

3) Details in posts: Students can reply to a post or reply to a layer in the post by clicking the button ”Provide a clue to this item!” Also, users can return to the home page by clicking the ”Back to all items lists.” button.

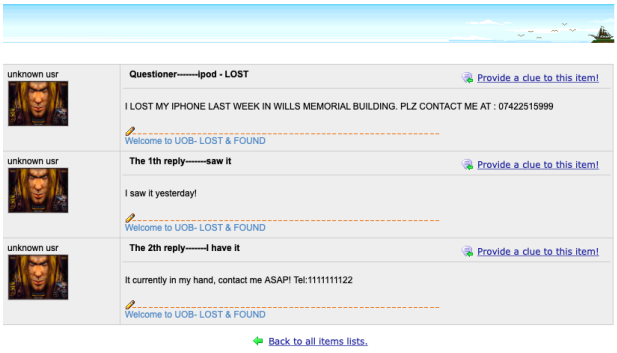

Fig. 4. details in posts

4) Automatic jump: parAfter replying to the post successfully, it will automatically jump back to the previous page.

Fig. 5. automatic jump

D. Login status detection

We check if each page is an administrator login, if not, return to the login screen

```
<%
String adminLogined = (String)session.getAttribute("adminLogined");
if(adminLogined == null || !adminLogined.trim().equals("true")) {
    response.sendRedirect("login.jsp");
    return;
}
 %>
```

Fig. 6. session check

VI. Depolyment

After we have implemented the main parts of our project, it is time to think about deploying it to the cloud so that people can use their own devices to access our website. The cloud services can provide us host servers and Database as the data center. The main steps of deploying are as following:

A. Creat and connect to an instance

Due to our project is not very big so the only cloud services we need is a cloud Infrastructure. We can simply think this thing as buying a computer running on cloud. Oracle cloud provide us a really convenient way to creat an instance. The image we choose is Windows-Server-2012-R2-Standard-Edition, because on windows can be easy using the tool ‘Microsoft Remote Desktop’ to connect to the instance and operate, manage just like we are using our own computer, Rather than typing a lot complicated command lines on whether centOS or Ubuntu. After creating instance following the tutorial, we need to open the port 3389 in networking ¿ virtual cloud networks ¿ security lists, so that we can connect to the instance using user name and passwords shown on the service page.

B. Necessary software preparations

The software we need is exactly the same as locally, which are Tomcat (Version 9.0.14), JDK (Version 9.0.1), and MySQL Database (Version 8.0.13). Installing Tomcat is easy, just extract the zip file downloaded from website to the c:/ root direction. Then download MySQL installer to choose the necessary products to install. Another thing about configuring MySQL is to ensure the port, user and passwords are identical as that in your programs. JDK installing is also easy but we need to add running path to the server computer like java_path and calss_path to ensure java is running normally on the host.

C. Source files uploading

Now we should from eclipse export the local project as a .war file. Then put this file into $/(tomacat_path)/webapps/, starting tomcat service using command or running the shell file from $/(tomacat_path)/bin/startup.bat. When we doing this, tomcat can automaticly deploying the web application to the default port 8080. And we can test running it by visit http://($host Ip address):8080/($webApp_Name).

D. Problem solutions

Usually a latent problem is we can not access the website from external networks. It is due to some security problems, windows close the access to 8080 port so we need to configure

the security lists by adding an new rule to open the port to public.

VII. System Testing

This system mainly adopts the black box test method. By inputting reasonable use cases and unreasonable use cases, the system function can be tested to meet the target requirements. The test process is outlined below:

- functional test
  The following functional modules were tested using the black box testing: The login module, the administrator function module, the posting module, and other modules can all operate normally.
- performance test (performance, reliability)
  As an initial version, there are not many concurrent users, so the performance requirements are not very high. The results of the operation meet the expected requirements.
- Evaluation
  After functional testing and basic performance testing, this version is suitable as an initial release. If you want to formally put into use, the architecture can be unchanged, but you need to rewrite the background program to improve the efficiency of the program and increase the number of concurrent users.

After testing, the system operation results basically meet the expected functional requirements and data security requirements, it is considered that the assembly test has passed. However, if it is to be put into use, the architecture can be changed. It is also necessary to rewrite the editing of the background program and the back-end database to improve the running efficiency of the program and increase the number of concurrent users.

VIII. Problem

In fact, because of the lack of sufficient time, we did not implement all the functions.

- First of all, we didn't implement the register function, which means, students can only log in as visitors temporarily, only administrator can log in to the website.
  Register function should be designed as Fig.5:

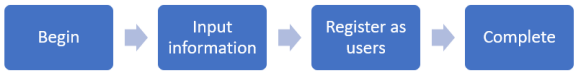

Fig. 7. register process

- There are three columns in the home page, "AUTHOR", "View times" and "Reply", which is static parameters, because we didn't implement the function.
- We didn't implement log out function, so if administrator want to log out, he needs to clear the cookie and refresh the webpage.
- Because of the limitation of time, we only set one table in the database for recording users.

IX. Further work

- Increase user registration and log in function.
- Improve administrator functions, increase the ability to modify and delete users, and increase the administrator's permission to operate on posts.
  The full administrator function should be as Fig.6:

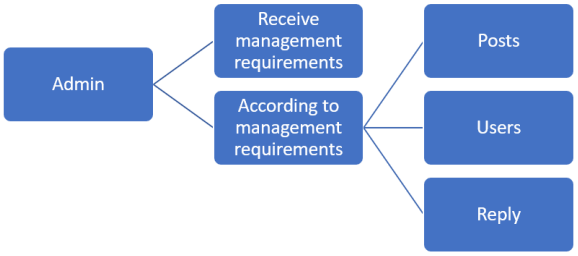

Fig. 8. Admin function

- Improve the posting page. Set two different Blocks for lost posts and found posts respectively. We can also set more items to get more specific information when posting, which will save users' time.
- Improve the database.

References

[1] Mell, P., and Grance, T. (2011). The NIST definition of cloud computing.
[2] Chung, K. (2013). JavaServer Pages Specification.
[3] Safonov, Vladimir O. (2016-01-29). Trustworthy Cloud Computing. John Wiley and Sons. ISBN 9781119113515.
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