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Problem Manage a Server Outage Scenario & an Issue & Change Request Management System

Module Project

Module: NICF Capstone Project using Java

Course: NICF Advanced Certificate in Software & Applications (Development & Deployment)

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1	4 th March 2016	First Edition	Satya CVS
2	23 rd Jul 2018	Changed for Module 6	Shrinivas K R

Contents

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S. No.	Description
01	Principles of Problem Management
02	Problem Management Example
03	Tools, Process & Technologies
04	Investigation & Diagnosis
05	Explain Prioritization
06	Problem Management Solution
07	Systems you will Implement
08	Project Milestones & Tasks
09	Milestone Feedback & Action taken
10	Modifications Made based On Feedback
11	Project Results
12	Proposed Improvements

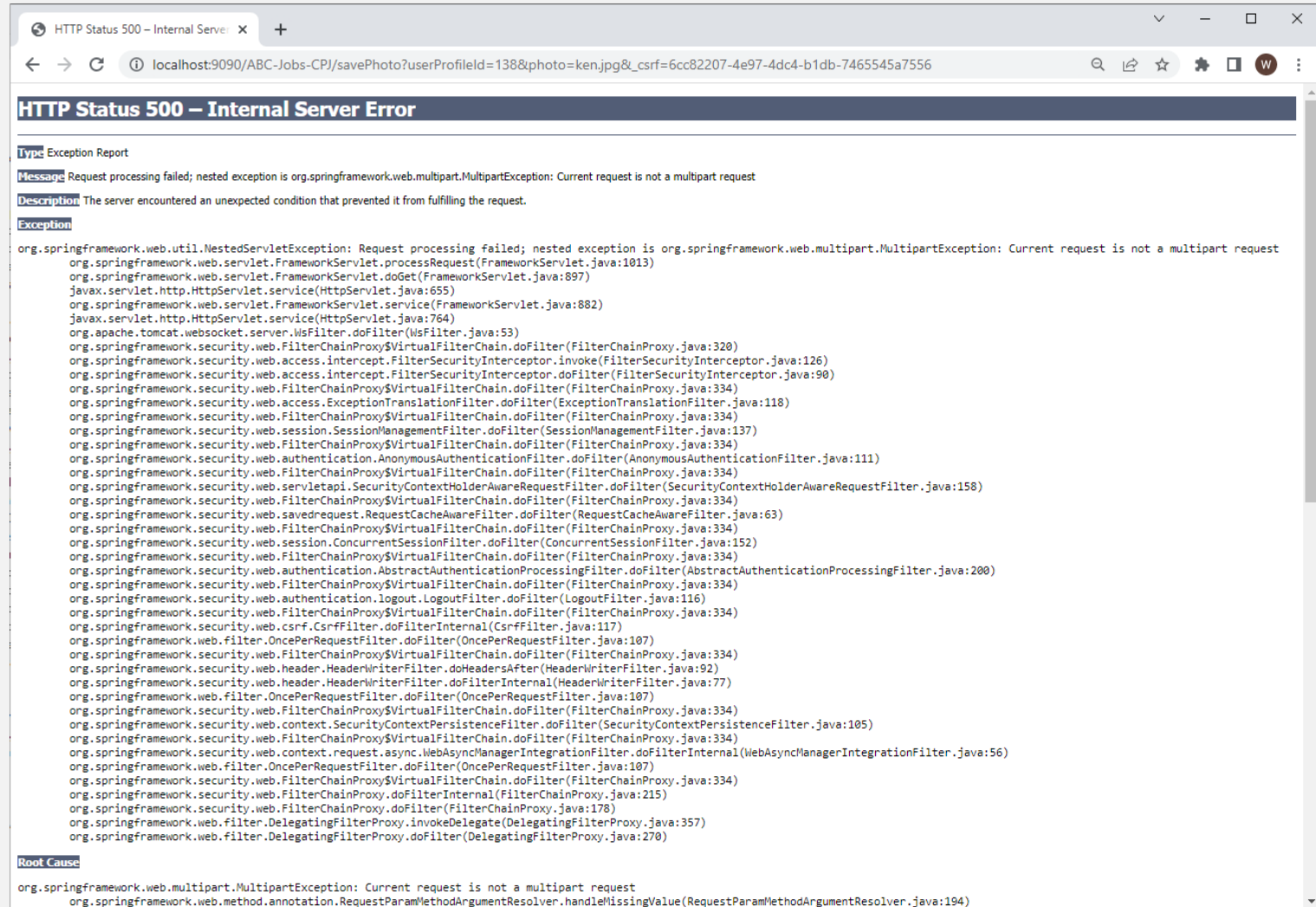
1. Principles of Problem Management

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- ☐ Create a team to own the problem management process
 - ☐ Have a problem committee or team that identifies, prioritizes, and assigns problems can effectively reduce business impact
- ☐ Analyse incident trends
 - ☐ Analyzing incident trends and reviewing high-impact incidents can help the team to identify problems
- ☐ Establish a well-defined problem management process
 - ☐ Implement a process that is easy and follows a logical sequence of steps, and complement other process such as incident management, change management
- ☐ Perform a root cause analysis
 - ☐ A root cause is the core of the problem, and removing the root cause ensures that the problem never recurs
- ☐ Strive towards problem management maturity
 - ☐ Proactive problem management involves identifying and resolving problems before incidents occur

2. Problem Management Example

❑ Member is unable to upload profile picture



HTTP Status 500 – Internal Server Error

Type Exception Report

Message Request processing failed; nested exception is org.springframework.web.multipart.MultipartException: Current request is not a multipart request

Description The server encountered an unexpected condition that prevented it from fulfilling the request.

Exception

```
org.springframework.web.util.NestedServletException: Request processing failed; nested exception is org.springframework.web.multipart.MultipartException: Current request is not a multipart request
    org.springframework.web.servlet.FrameworkServlet.processRequest(FrameworkServlet.java:1013)
    org.springframework.web.servlet.FrameworkServlet.doGet(FrameworkServlet.java:897)
    javax.servlet.http.HttpServlet.service(HttpServlet.java:655)
    org.springframework.web.servlet.FrameworkServlet.service(FrameworkServlet.java:882)
    javax.servlet.http.HttpServlet.service(HttpServlet.java:764)
    org.apache.tomcat.websocket.server.WsFilter.doFilter(WsFilter.java:53)
    org.springframework.security.web.FilterChainProxy$VirtualFilterChain.doFilter(FilterChainProxy.java:320)
    org.springframework.security.web.access.intercept.FilterSecurityInterceptor.invoke(FilterSecurityInterceptor.java:126)
    org.springframework.security.web.access.intercept.FilterSecurityInterceptor.doFilter(FilterSecurityInterceptor.java:90)
    org.springframework.security.web.FilterChainProxy$VirtualFilterChain.doFilter(FilterChainProxy.java:334)
    org.springframework.security.web.access.ExceptionTranslationFilter.doFilter(ExceptionTranslationFilter.java:118)
    org.springframework.security.web.FilterChainProxy$VirtualFilterChain.doFilter(FilterChainProxy.java:334)
    org.springframework.security.web.session.SessionManagementFilter.doFilter(SessionManagementFilter.java:137)
    org.springframework.security.web.FilterChainProxy$VirtualFilterChain.doFilter(FilterChainProxy.java:334)
    org.springframework.security.web.authentication.AnonymousAuthenticationFilter.doFilter(AnonymousAuthenticationFilter.java:111)
    org.springframework.security.web.FilterChainProxy$VirtualFilterChain.doFilter(FilterChainProxy.java:334)
    org.springframework.security.web.servletapi.SecurityContextHolderAwareRequestFilter.doFilter(SecurityContextHolderAwareRequestFilter.java:158)
    org.springframework.security.web.FilterChainProxy$VirtualFilterChain.doFilter(FilterChainProxy.java:334)
    org.springframework.security.web.savedrequest.RequestCacheAwareFilter.doFilter(RequestCacheAwareFilter.java:63)
    org.springframework.security.web.FilterChainProxy$VirtualFilterChain.doFilter(FilterChainProxy.java:334)
    org.springframework.security.web.session.ConcurrentSessionFilter.doFilter(ConcurrentSessionFilter.java:152)
    org.springframework.security.web.FilterChainProxy$VirtualFilterChain.doFilter(FilterChainProxy.java:334)
    org.springframework.security.web.authentication.AbstractAuthenticationProcessingFilter.doFilter(AbstractAuthenticationProcessingFilter.java:200)
    org.springframework.security.web.FilterChainProxy$VirtualFilterChain.doFilter(FilterChainProxy.java:334)
    org.springframework.security.web.authentication.logout.LogoutFilter.doFilter(LogoutFilter.java:116)
    org.springframework.security.web.FilterChainProxy$VirtualFilterChain.doFilter(FilterChainProxy.java:334)
    org.springframework.security.web.csrf.CsrfFilter.doFilterInternal(CsrfFilter.java:117)
    org.springframework.security.web.filter.OncePerRequestFilter.doFilter(OncePerRequestFilter.java:107)
    org.springframework.security.web.FilterChainProxy$VirtualFilterChain.doFilter(FilterChainProxy.java:334)
    org.springframework.security.web.header.HeaderWriterFilter.doHeadersAfter(HeaderWriterFilter.java:92)
    org.springframework.security.web.header.HeaderWriterFilter.doFilterInternal(HeaderWriterFilter.java:77)
    org.springframework.security.web.filter.OncePerRequestFilter.doFilter(OncePerRequestFilter.java:107)
    org.springframework.security.web.FilterChainProxy$VirtualFilterChain.doFilter(FilterChainProxy.java:334)
    org.springframework.security.web.context.SecurityContextPersistenceFilter.doFilter(SecurityContextPersistenceFilter.java:105)
    org.springframework.security.web.FilterChainProxy$VirtualFilterChain.doFilter(FilterChainProxy.java:334)
    org.springframework.security.web.context.request.async.WebAsyncManagerIntegrationFilter.doFilterInternal(WebAsyncManagerIntegrationFilter.java:56)
    org.springframework.security.web.filter.OncePerRequestFilter.doFilter(OncePerRequestFilter.java:107)
    org.springframework.security.web.FilterChainProxy$VirtualFilterChain.doFilter(FilterChainProxy.java:334)
    org.springframework.security.web.FilterChainProxy.doFilterInternal(FilterChainProxy.java:215)
    org.springframework.security.web.FilterChainProxy.doFilter(FilterChainProxy.java:178)
    org.springframework.web.filter.DelegatingFilterProxy.invokeDelegate(DelegatingFilterProxy.java:357)
    org.springframework.web.filter.DelegatingFilterProxy.doFilter(DelegatingFilterProxy.java:270)
```

Root Cause

```
org.springframework.web.multipart.MultipartException: Current request is not a multipart request
    org.springframework.method.annotation.RequestParamMethodArgumentResolver.handleMissingValue(RequestParamMethodArgumentResolver.java:194)
```

3. Tools, Process & Technologies

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□ Process



3. Tools, Process & Technologies

- ☐ Detect the problem
 - ☐ Call center or help desk
- ☐ Log the problem
 - ☐ Issue ticketing system
- ☐ Categorize the problem
 - ☐ Categorize with the help of the ticketing system
 - ☐ help in assignment of correct follow-up actions or resources
- ☐ Prioritize the problem
 - ☐ Based on the impact to the user and on the business
 - ☐ Critical cases get higher priority for remedy actions
- ☐ Investigate and diagnosing the problem
 - ☐ Analysing the incident, simulation, debugging
 - ☐ Brainstorming
 - ☐ Ishikawa / Fishbone / Cause and Effect Analysis
 - ☐ Kepner Tregoe Problem Analysis
 - ☐ 5 Whys

3. Tools, Process & Technologies

- ☐ Identify a workaround for the problem
 - ☐ Repeated incident
 - ☐ Temporary measure
- ☐ Raise a known error record
 - ☐ Workaround recorded as a known error in KEDB to resolve repeated incidents quickly
- ☐ Resolve the problem
 - ☐ Resolves the root cause prevents recurring incidents
 - ☐ Sometimes require change management.
- ☐ Close the problem
 - ☐ Problem is resolved and ticketing system updated
- ☐ Review the problem
 - ☐ Documentation to identify what happened and why
 - ☐ Lessons learned - process bottlenecks, what went wrong, and what helped
 - ☐ Review is to prevent future problems

3. Tools, Process & Technologies

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Tools & Techniques

The screenshot displays the Eclipse IDE interface. The main editor shows the `UserProfileController.java` file with the following code:

```
175 public ModelAndView showUsers() {
176     List<User> userList = userService.findAll();
177     ModelAndView mav = new ModelAndView("showUsers");
178     mav.addObject("userList", userList);
179     return mav;
180 }
181
182 @RequestMapping(value = "/uploadPhoto", method = RequestMethod.GET)
183 public ModelAndView uploadPhoto(@RequestParam("pid") long pid) {
184     UserProfile userProfile = userService.getUserProfileById(pid).get();
185     ModelAndView mav = new ModelAndView("uploadPhoto");
186     mav.addObject("userProfile", userProfile);
187     return mav;
188 }
189
190 @RequestMapping(value = "/savePhoto", method = RequestMethod.GET)
191 public String savePhoto(@ModelAttribute UserProfile formUserProfile, @Request
192     UserProfile userProfile = userService.getUserProfileById(formUserProfile
193     userProfile.setPhoto(formUserProfile.getPhoto());
194     userService.saveUserProfile(userProfile);
195     long fileSize = multipartFile.getSize();
196     String fileName = multipartFile.getOriginalFilename();
197     if(fileService.saveFile(multipartFile)){
198         Map<String, Object> modelMap = new HashMap<>();
199         modelMap.put("fileName", fileName);
200         modelMap.put("fileSize", fileSize);
201     }
202     return "redirect:/showProfile";
203 }
204
205 // Sample code for file upload using FileService
206 @RequestMapping(value = "/upload", method = RequestMethod.POST)
207 public ModelAndView uploadFile(@RequestParam("file") MultipartFile multipart
```

The left sidebar shows the Project Explorer with the following structure:

- Daemon Thread [http-nio-9090-exec-7]
- owns: NioEndpoint\$NioSocketWrap
- UserProfileController.uploadPhoto(lc
- NativeMethodAccessorImpl.invoke(
- NativeMethodAccessorImpl.invoke(
- DelegatingMethodAccessorImpl.invc
- Method.invoke(Object, Object...) line
- ServletInvocableHandlerMethod(Invc
- ServletInvocableHandlerMethod(Invc
- ServletInvocableHandlerMethod.invc
- RequestMappingHandlerAdapter.inv
- RequestMappingHandlerAdapter.ha
- RequestMappingHandlerAdapter(Ab
- DispatcherServlet.doDispatch(HttpSe
- DispatcherServlet.doService(HttpServ
- DispatcherServlet(FrameworkServlet
- DispatcherServlet(FrameworkServlet
- DispatcherServlet(HttpServlet).servi
- DispatcherServlet(FrameworkServlet
- DispatcherServlet(FrameworkServlet
- DispatcherServlet(HttpServlet).servi
- ApplicationFilterChain.internalDoFilt
- ApplicationFilterChain.doFilter(Servl
- WsFilter.doFilter(ServletRequest, Serv
- ApplicationFilterChain.internalDoFilt
- ApplicationFilterChain.doFilter(Servl
- FilterChainProxy\$VirtualFilterChain.d
- FilterSecurityInterceptor.invoke(Filter
- FilterSecurityInterceptor.doFilter(Serv
- FilterChainProxy\$VirtualFilterChain.d
- ExceptionHandlerFilter.doFilter(Se
- FilterChainProxy\$VirtualFilterChain.d
- SessionManagementFilter.doFilter(Se
- FilterChainProxy\$VirtualFilterChain.d
- AnonymousAuthenticationFilter.doF
- FilterChainProxy\$VirtualFilterChain.d
- SecurityContextHolderAwareRequest

The right sidebar shows the Breakpoints view with the following settings:

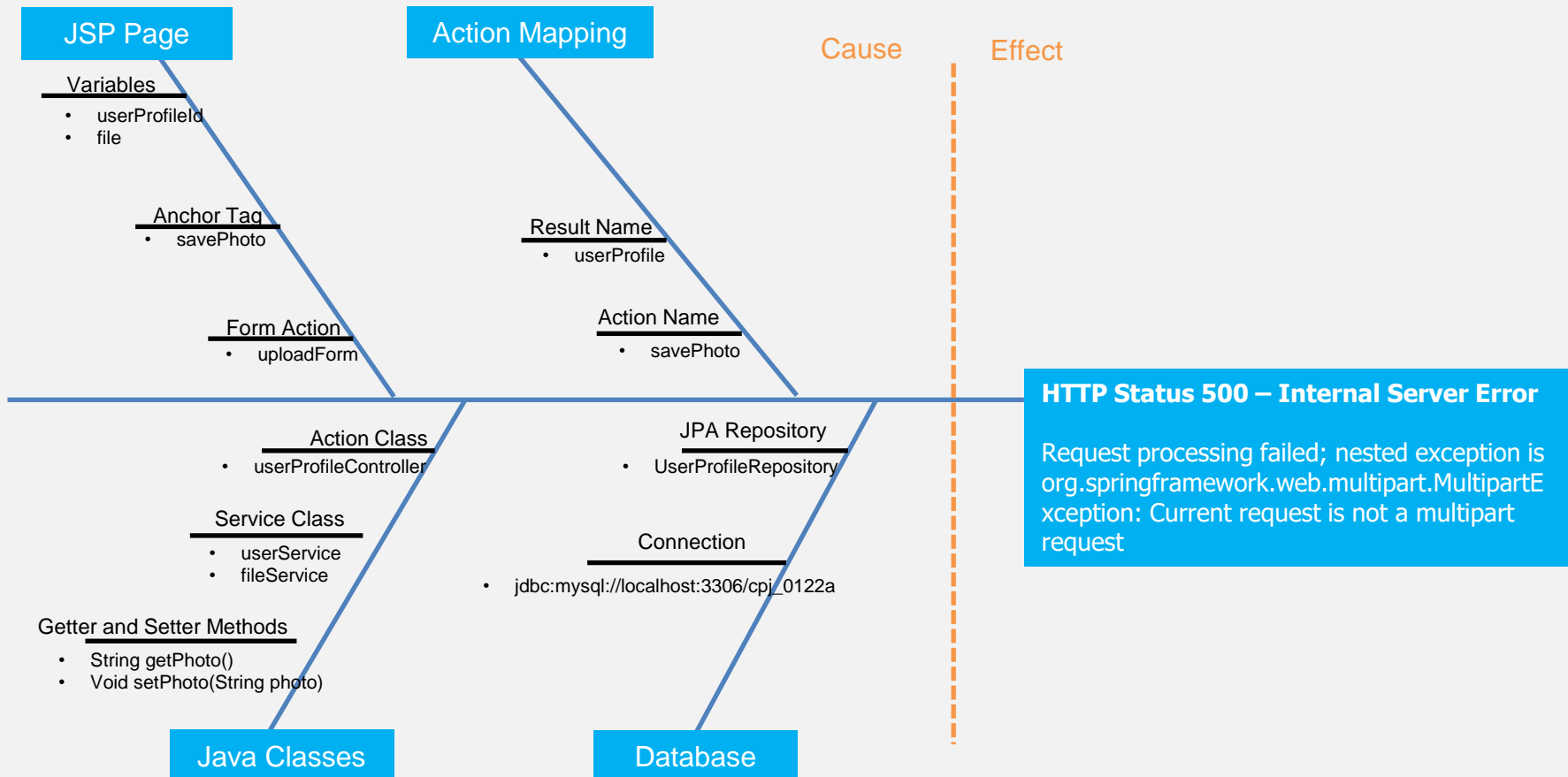
- Trigger Point
- Hit count:
- ☒ Suspend thread
- ☒ Entry ☐ Exit
- ☐ Conditional ☒ Suspend when 'true' ☐ Suspe
- <Choose a previously entered condition>

The bottom console shows the following output:

```
Tomcat v9.0 Server at localhost [Apache Tomcat] C:\Program Files\Java\jdk1.8.0_311\bin\javaw.exe (28 Jun 2022, 3:48:25 pm) [pid: 11572]
experience0_.experienceUserProfileId as experien4_1_,
experience0_.position as position5_1_
from
Experience experience0_
where
experience0_.experienceUserProfileId=?
```

4. Investigation & Diagnosis

Problem – Unable to upload profile picture



5. Explain Prioritization

- ☐ Problem Category – Major
- ☐ Problem Priority – High
- ☐ Problem Frequency - Always
- ☐ User unable to complete the profile picture upload
- ☐ No impact to the functionalities of the community portal
- ☐ Complete exception screen is shown which is a potential security exposure

Scenario ID	Precondition	Test Step	Test Data	Expected Result	Actual Result	Pass/Fail	Problem Category	Problem Priority	Problem Frequency
TS0008	1. Community Portal installed 2. Existing user	1. Goto Profile page after login 2. Click User icon in the left panel 3. Select the picture to upload and submit	Email = ken@gmail.com Password = 1234 File = ken.jpg	Should go to the profile page to show the updated information.	Did not show the profile page as expected. An error page of HTTP Status 500 – Internal Server Error is shown.	Fail	Major	High	Always

6. Problem Management Solution

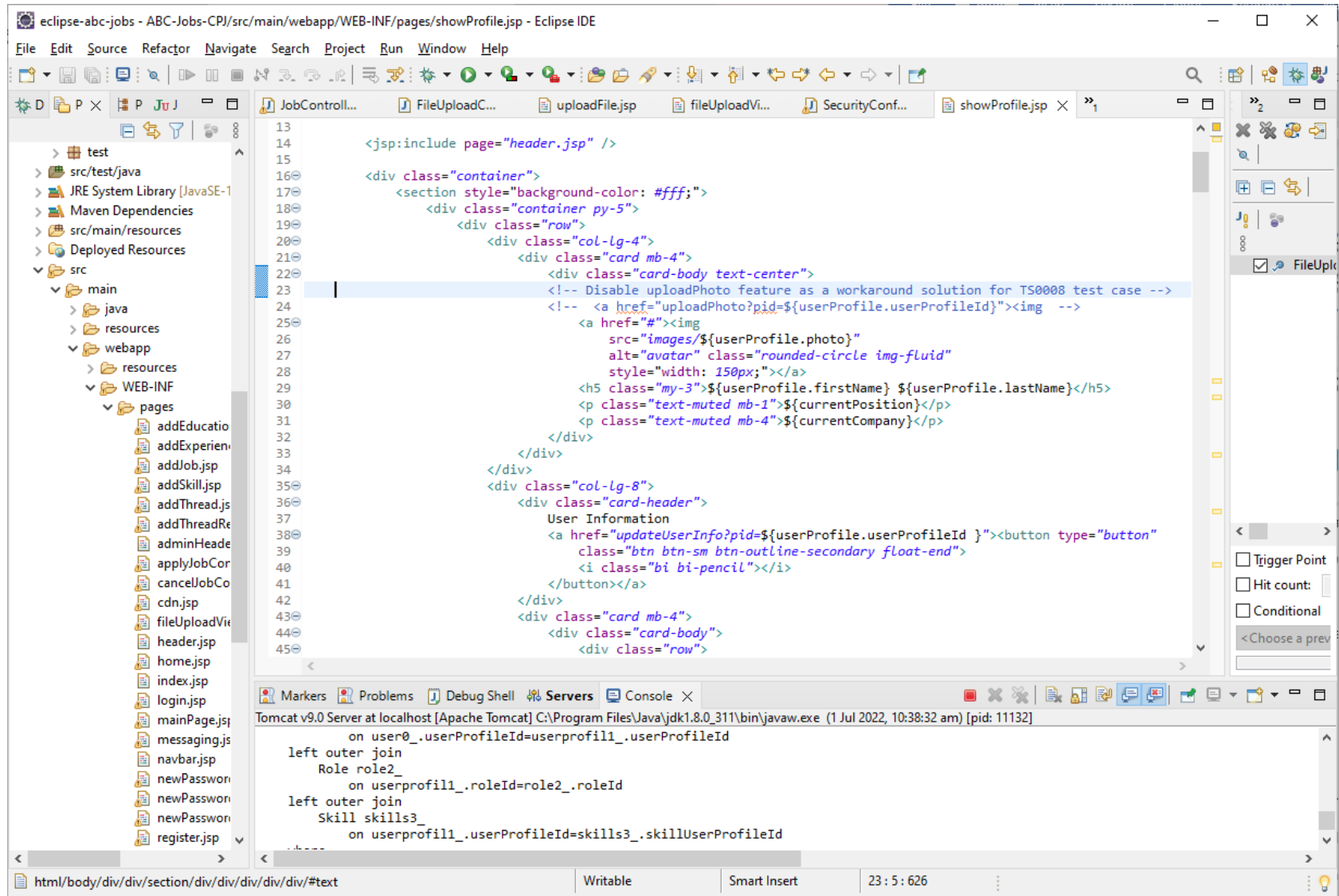
- ☐ **Not a critical feature of the community portal and has no impact to operation of the community portal**
- ☐ **Problem Resolution**
 - ☐ Disable profile picture upload feature in the profile page as a workaround
 - ☐ Code change to disable the profile upload feature and redeployment of the code
 - ☐ Code amendment to allow profile picture upload to be included into the fixes in the next release version of the application

Known Error Database

Issue #	Issue Description	Issue Type	Root Cause	Workaround	Status	Date Resolved
1	Unable to upload profile picture	Technical	UserProfileController unable to receive the file upload information	Code change to disable upload of profile picture in Profile page	Resolved	28/6/2022

6. Problem Management Solution

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The screenshot shows the Eclipse IDE interface. The main editor displays a JSP file named `showProfile.jsp` with the following code:

```
13 <jsp:include page="header.jsp" />
14
15 <div class="container">
16   <section style="background-color: #fff;">
17     <div class="container py-5">
18       <div class="row">
19         <div class="col-lg-4">
20           <div class="card mb-4">
21             <div class="card-body text-center">
22               <!-- Disable uploadPhoto feature as a workaround solution for TS0008 test case -->
23               <!-- <a href="uploadPhoto?pid=${userProfile.userId}">img -->
24               <a href="#"></a>
28               <h5 class="my-3">${userProfile.firstName} ${userProfile.lastName}</h5>
29               <p class="text-muted mb-1">${currentPosition}</p>
30               <p class="text-muted mb-4">${currentCompany}</p>
31             </div>
32           </div>
33         </div>
34       </div>
35       <div class="col-lg-8">
36         <div class="card-header">
37           User Information
38           <a href="updateUserInfo?pid=${userProfile.userId}"><button type="button"
39             class="btn btn-sm btn-outline-secondary float-end">
40             <i class="bi bi-pencil"></i>
41           </button></a>
42         </div>
43         <div class="card mb-4">
44           <div class="card-body">
45             <div class="row">
```

The console output shows the following SQL query and results:

```
Tomcat v9.0 Server at localhost [Apache Tomcat] C:\Program Files\Java\jdk1.8.0_311\bin\javaw.exe (1 Jul 2022, 10:38:32 am) [pid: 11132]
on user0_.userId=userprofil1_.userId
left outer join
  Role role2
on userprofil1_.roleId=role2_.roleId
left outer join
  Skill skills3
on userprofil1_.userId=skills3_.skillUserId
```

7. Systems you will Implement

☐ **Call Center or Service Help Desk**

- ☐ First level contact point for end user to report any issue encountered when using the application.

☐ **Issue Tracking System**

- ☐ Track problem from identification to resolution

☐ **Know Error Database**

- ☐ To resolve repeated incidents quickly at the first level support.

☐ **Change Request Management**

- ☐ To track the request, monitor the progress of the change until the deployment of the change

☐ **Source Code Version Control System**

- ☐ To track source code, backup, rollback if required

8. Project Milestones & Tasks

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Project Task ID	Project Task Description	Project Milestone ID
1	Explain principles of problem management across its lifecycle	1
2	Use various tools, process and technologies to facilitate problem identification, investigation, analysis & resolution	1
3	Explain various steps to investigate & diagnose problems	2
4	Prioritize & Categorize change requests	2
5	Prepare a solution to address the root cause of the problem	2
6	Document & Monitor the problems	3
7	Explain best practices in documenting problems	3

9. Milestone Feedback & Action taken



Project Milestone ID	Milestone Feedback received from Tutor / Learning Facilitator	Action Taken (Yes / No)
1		
2	Include Fish-Bone diagram for investigation and diagnosis	Yes
3		

10. Modifications Made based On Feedback **LITHAN**

- ☐ Include the Fish-Bone diagram in the presentation

11. Project Results

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TestCases.xlsx - Excel											
File Home Insert Page Layout Formulas Data Review View Help Tell me what you want to do											
A1 Scenario ID											
Scenario ID	Precondition	Test Step	Test Data	Expected Result	Actual Result	Pass/Fail	Problem Category	Problem Priority	Problem Frequency		
			City = Singapore Country = Singapore								
TS0008	1. Community Portal installed 2. Existing user	1. Goto Profile page after login 2. Click User icon in the left panel 3. Select the picture to upload and submit	Email = ken@gmail.com Password = 1234 File = ken.jpg	Should go to the profile page to show the updated information.	Did not show the profile page as expected. An error page of HTTP Status 500 – Internal Server Error is shown.	Fail	Major	High	Always		
TS0009	1. Community Portal installed 2. Existing user	1. Goto Profile page after login 2. Click Plus icon in Education	Email = ken@gmail.com Password = 1234								

KEDB.xlsx - Excel							
File Home Insert Page Layout Formulas Data Review View Help Tell me what you want to do							
G2 Date Resolved							
Known Error Database							
Issue #	Issue Description	Issue Type	Root Cause	Workaround	Status	Date Resolved	
1	Unable to upload profile picture	Technical	UserProfileController unable to receive the file upload information	Code change to disable upload of profile picture in Profile page	Resolved	28/6/2022	
3							
4							
5							

12. Proposed Improvements

☐ List of Improvements

- Source code version control
- Merge bug fixes (reactive & proactive) and dependencies update
- Enhancement and Change Request Management