

CS991 MOBILE APPLICATION DEVELOPMENT
COURSEWORK ASSIGNMENT

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The Task

Overview

1. *Usability* evaluation techniques
2. Graphical User Interface on *prototyping* level
3. *Requirements* analysis
4. Role of either: *developer* or *software engineer*

Target

- Students
- Course directors

Specification

CIS Personal Circumstances Manager which [1] allows (registered) students to record personal circumstances and [2] allows course directors to monitor the personal circumstances of students during the academic year.

- Students
 - Log in to institution w/ username and password
 - View current and historic personal circumstances
 - Edit current personal circumstances
 - Delete current personal circumstances
 - Add new personal circumstances (start date, end date, description, optional attachment w/ evidence)
 - Log out
- Course Directors
 - Log in to institution w/ username and password
 - View list of students w/ recorded personal circumstances
 - View details of each personal circumstances entry
 - Search for student using registration number
 - Order personal circumstances by start date - most recent
 - Log out

1 Core Task: Heuristic Evaluation

1.1 Basics

As an alternative to empirical, formal and automated methodologies where people or a series of pre-defined simulations test software throughout various stages and levels of relevance in the design process; Nielsen (1994) proposes a critique-based heuristic evaluation method which involves feedback relative to particular areas of expertise. Nielsen finds that this approach is effective before user testing, as minor issues should not be allocated space or time in user testing; before redesign, as relevant subjective opinion may skew in a direction not necessarily followed initially; when you're aware of issues however desire assurance so time is not wasted on them; and, pre-final release for the final polish.

Nielsen also claims that the optimal number of 'experts' assigned to an evaluation is three to five, in order to find the optimal number of problems relative to the cost-benefit analysis. In this case however, of course only one is being used as the problem sample is likely to be extremely small. Each problem should be listed individually and marked against the set of ten heuristic factors and a severity rating, as seen in Table 1.1. There should be two or three passes upon each problem.

Heuristics
H ₁ : Visibility of System Status
H ₂ : System-Real-World Match
H ₃ : User Control & Freedom
H ₄ : Consistency & Standards
H ₅ : Error Prevention
H ₆ : Recognition Rather than Recall
H ₇ : Flexibility & Efficiency of Use
H ₈ : Aesthetic & Minimalist Design
H ₉ : User Recognition, Diagnostic & Recovery from Error
H ₁₀ : Help & Documentation
Severity Ratings
S ₀ : Don't think it is a usability problem
S ₁ : Cosmetic issue; repair in additional time
S ₂ : Minor usability problem; allocate low priority to repair
S ₃ : Major usability problem; allocate high priority to repair
S ₄ : Critical error; repair immediately

Table 1.1: Heuristics & Severity Rating

1.2 Analysis

DESCRIPTION	VIO.	SEV.	PROPOSED SOLUTION
Location: Adding a personal circumstances report is a very common protocol amongst students, from my experience. Although I've never completed one myself, at least (approx.) 30% of students I've known have. Therefore, that makes this feature just as relevant as something like booking a library room, for example. Which is a prominent feature. This feature should be just as accessible.	H7	S2	Create major link as opposed to hierarchical path.
Spacing: Major heading on the primary form page has inconsistent spacing (margins/ local padding) which is too small and looks improper against the consistently high line height throughout the form.	H4, H8	S1	Increase heading margin.
Scaling: Page does not scale well to medium-small device widths. This means elements are lost and unreadable	H8	S1	Correct style scaling to scale below 300%.
Gutters: White space gutters in main text body division appear too narrow and therefore make long strings of text harder to read. This also makes elements such as the text input box appear to wide.	H8	S1	Increase gutters by approximately 5%
Date Input Boxes: Input boxes for 'first date of circumstance' and 'last date of circumstance' are of <code>text</code> type and therefore there is a greyscale prompt posted above the input boxes to encourage the user to follow a particular format, which is just awkward as users must enter a series of special characters in particular places.	H7	S2	Change the input type of the input boxes to date so there is always the correctly defined input format, and remove the greyscale prompt.
Date Select: Next to the input boxes for the discussed dates, are optional date select features which allow the user to find dates using a calendar system. These features open in a new browser window. This may be an issue where certain user browser preferences may block features such as links opening new windows, etc. The user may also be left unaware of what the issue is if the new window does not open as there is no protocol in place to inform them.	H3, H4, H5	S2	By including these date select features as a drop-down or pop-up overlay would reduce browser associated issues. Further, removing the feature altogether may be more effective in reducing bloat, if the previously discussed amendments to the date input boxes are implemented.
Date Select Window: The graphic design/styling of the new window displaying the date select calendar is completely inconsistent with the primary Pegasus stylesheet. This isn't really a big issue as your just selecting three things however, for the sake of consistency and continuity, this is inappropriate.	H4, H8	S2	Amend, for consistency: colors: spacing, font, font-decoration, margin and padding standards, table borders, to name a few.

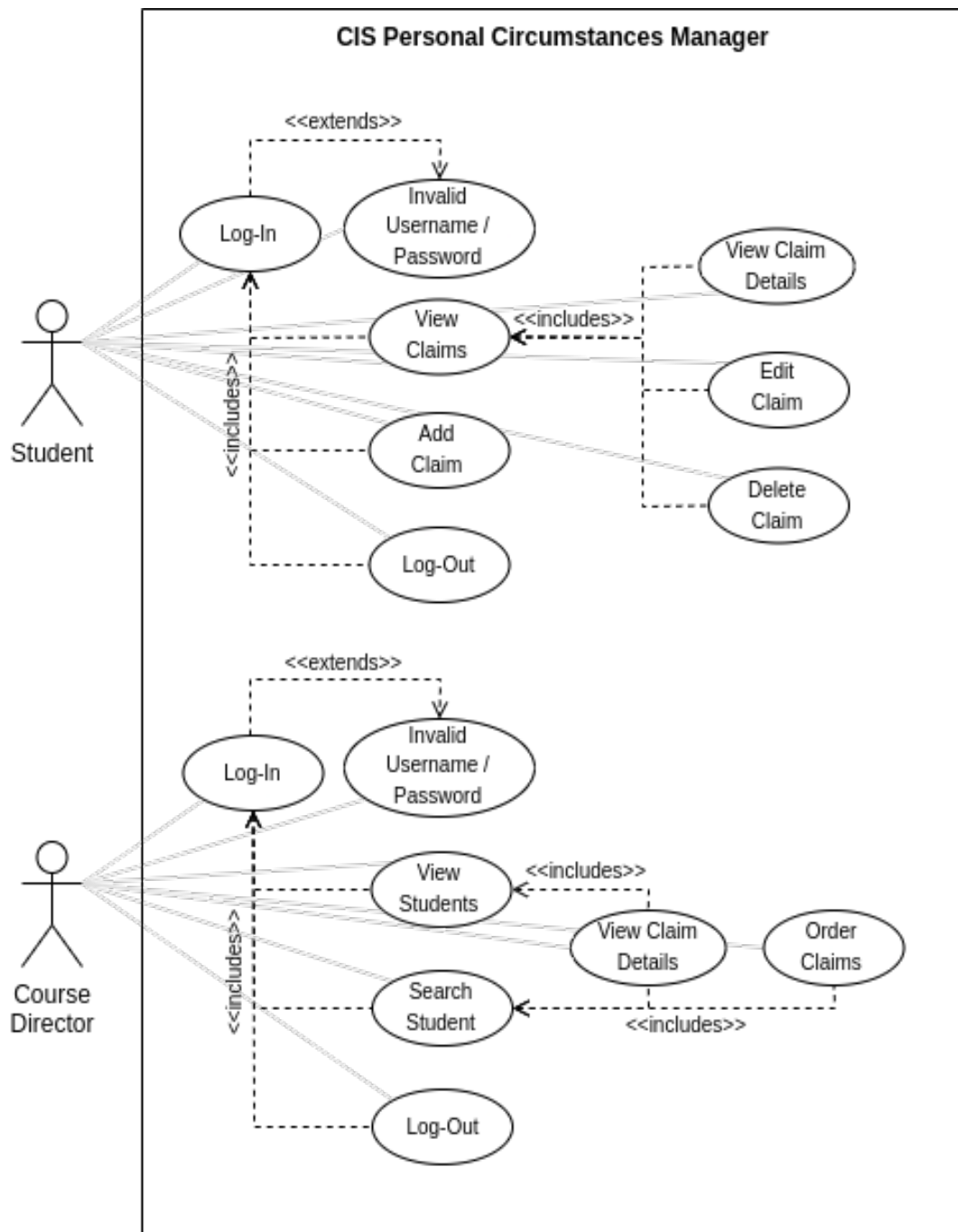
Description Input Box: The description input box has an infinite character limit but a text prompt and subsequent example encouraging the user to keep their text brief. This is bloated and ineffective as the user is still free to abuse the input box. Additionally, the prompt and example take up space with, effectively irrelevant, content which can be replaced with additional minor functionality features.	H ₁ S ₂ (Space), H ₇ , H ₈	Include a word limit and placeholder which restricts and prompts the user to keep their text brief in a more effective manner.
Edit Practicality: If a user wishes to alter an existing personal circumstances request, they are prompted to enter their active requests, delete the one with an error and create a new one in its place. This is unnecessarily time consuming for the user.	H ₅ , S ₂ H ₇	Add a feature which allows users to edit the 3 input elements (start date, end date and description) of their existing requests.
Session Time-Out: A more general issue with Pegasus; there is no prompt to allow the user to choose between extending their session or logging out if they've been idle for too long. Instead, when you attempt to use a function on the page, you are notified that your session has timed out and you're returned to the login page.	H ₁ S ₂ (Change), H ₇	Either: introduce a pop-up (or something of the sort) prompt when a user has been idle too long, requesting that they either extend their session or log-out. Or when the session times out, instead of landing the user at the homepage after re-login, take them to their last page accessed.
Completion Notification: Once a request is complete, there is no notification to inform the user that their request has been successfully submitted. The user is just redirected to the home page. This may lead to confusion as the user must manually check against their records to ensure their most recent request has been submitted. If there are multiple requests, this may become awkward and more time consuming than is necessary.	H ₁ S ₂ (Next Steps / Completion)	Include a notification of success (pop-up overlay, new page, redirect to relevant page, etc.) if the request has been successfully. Or, a notification of failure, including a reason and redirection to a relevant page, if the request has not been successfully submitted.
Viewing Existing Entries: On the table of existing personal circumstances requests, the link to open the request details is broken (although working in the demonstration video provided under identical circumstances). The link highlighted on the titles of created circumstance requests simply leads to the current page thus, in effect, 'refreshing' the page. Therefore, features such as the option to delete an entry or edit an entry are unavailable. As this is the only way to access them, it makes these required features completely unusable in cases where they may be necessary.	H ₃ , S ₃ H ₇	Correct link/path.
TOTAL VIOLATIONS: 12		
EVALUATOR: Lewis Britton		
PLATFORM(S): Brave Browser (Desktop), Brave Browser (Mobile)		

Table 1.2: Heuristic Analysis

2 Use Cases

2.1 Use Case Diagram

Note that the log-in and log-out cases appear once per actor as they serve different functions and exchange different data types, to different locations.



2.2 Use Case Descriptions

ACTOR: STUDENT	
LOG-IN	
TRIGGER	A student wishes to log-in to their account.
SCENARIO	A student wishes to view, edit, delete or add a personal circumstances claim.
PRECONDITION(S)	A student must hold an account.
POST CONDITION(S)	They must use their correct username and password to log-in.
MAIN PATH	A student has the ability to view, edit, delete or add a personal circumstances claim, and log-out from within the system.
ALTERNATIVE PATH	A student arrives at log-in page.
	They select their account type: 'student'.
	They enter their username and password.
	They select the submit button.
ALTERNATIVE PATH	A student enters incorrect username/password.
	They are prompted to complete the form again.
	Or:
	A student logs-out from within the system.
INVALID USERNAME/PASSWORD	
TRIGGER	A student enters the incorrect username/password combination.
SCENARIO	A student has accidentally entered the wrong username/password. A student has forgotten their username/password. An unprepared student is attempting to gain access to an account which is not theirs.
PRECONDITION(S)	A student must have a valid account (therefore, username/password). They must enter either a valid existing username or password with an unmatching adjacent username/password.
POST CONDITION(S)	A student is prompted to enter their log-in details again.
MAIN PATH	A student enters the wrong username/password relative to the account they're attempting to access at the username/password stage of the log-in protocol.
ALTERNATIVE PATH	N/A
VIEW CLAIMS	
TRIGGER	A student selects the 'view claims option' from the student page header.
SCENARIO	A student wishes to view their active (pending) claims. A student wishes to view their expired (historically granted/denied) claims.
PRECONDITION(S)	A student must be logged-in.
POST CONDITION(S)	A student can view all of their active and expired claims.
MAIN PATH	They have the option to edit or delete any active claim.
ALTERNATIVE PATH	A student lands on this page after log-in.
ALTERNATIVE PATH	They select the 'view claims' option from the student page header. This is available from both the 'view claims' and 'add claim' pages.
VIEW CLAIM DETAILS	
TRIGGER	A student selects the 'view' option under the details heading from within a particular claim row.
SCENARIO	A student wishes to view the additional text which they previously submitted under their claim details, when creating the claim.

PRECONDITION(s)	A student must be logged-in.
POST CONDITION(s)	They must be on the 'view claims' page. A student can view the the additional text. They can select the view option again to hide the additional text.
MAIN PATH	A student lands on the 'view claims' page after log-in. They select the 'view' option under the details heading from within a particular claim row.
ALTERNATIVE PATH	N/A
EDIT CLAIM	
TRIGGER	A student selects the 'edit' option from within a particular claim row.
SCENARIO	A student wishes to edit all possible details (title, start date, end date, details (description), attachments) of a previously submitted claim.
PRECONDITION(s)	A student must be logged-in. They must be on the 'view claims' page. They must select an acitve claim to edit, the edit option is not avail- able for expired claims.
POST CONDITION(s)	A student is presented with a new page which resembles that of adding new claims where they can enter (change) the claim title, start date, end date, details (description), and attachments. All of the claim's existing details are copied as placeholders to the input options. They can use the submit button to submit the changes.
MAIN PATH	A student lands on the 'view claims' page after log-in. They select the 'edit' option from within a particular claim row.
ALTERNATIVE PATH	N/A
DELETE CLAIM	
TRIGGER	A student selects the 'delete' option from within a particular claim row.
SCENARIO	A student wishes to remove a previously submitted claim.
PRECONDITION(s)	A student must be logged in. They must be on the 'view claims' page. They must select an acitve claim to delete, the delete option is not available for expired claims.
POST CONDITION(s)	A claim and all of its attributes are removed from the system. A student can no longer view this claim.
MAIN PATH	A student lands on the 'view claims' page after log-in. They select the 'delete' option from within a particular claim row.
ALTERNATIVE PATH	N/A
ADD CLAIM	
TRIGGER	A student selects the 'add claim' option from the student page header.
SCENARIO	A student wishes to add a new personal circumstances claim.
PRECONDITION(s)	A student must be logged in.
POST CONDITION(s)	A student is presented with an input form where they can enter the claim title, start date, end date, details (description), and attachments of a new claim. They can use the submit button to submit the new claim. The new claim and all of its details will be available to view under 'view claims' → 'active claims'.
MAIN PATH	A student lands on the 'view claims' page after log-in. They select the 'add claim' option from the student page header. They land on the 'add claim' page.
ALTERNATIVE PATH	N/A
LOG-OUT	

TRIGGER	A student wishes to log-out of their account.
SCENARIO	A student wishes to terminate their browsing of their personal circumstance claims.
PRECONDITION(s)	A student must be logged-in to the system (meaning they are on the main site pages, not the log-in stages).
POST CONDITION(s)	A student is returned to the log-in page (select account type step) and has the option to leave the site or to log-back-in.
MAIN PATH	A student is on any page of the main student system (i.e. not the login stages).
ALTERNATIVE PATH	They select the 'log-out' button on the header. N/A
ACTOR: COURSE DIRECTOR	
LOG-IN	
TRIGGER	A course director wishes to log-in to their account.
SCENARIO	A course director wishes to view, edit, delete or add a personal circumstances claim.
PRECONDITION(s)	A course director must hold an account. They must use their correct username and password to log-in.
POST CONDITION(s)	A course director has the ability view students (view claim details), search for a student (view claim details, order claims by date), and log-out from within the system.
MAIN PATH	A course director arrives at log-in page. They select their account type: 'course director'. They enter their username and password. They select the submit button.
ALTERNATIVE PATH	A course director enters incorrect username/password. They are prompted to complete the form again. Or: A course director logs-out from within the system. They must complete and submit the form again to log-back-in.
INVALID USERNAME/PASSWORD	
TRIGGER	A course director enters the incorrect username/password combination.
SCENARIO	A course director has accidentally entered the wrong username/password. A course director has forgotten their username/password. An unprepared course director is attempting to gain access to an account which is not theirs.
PRECONDITION(s)	A course director must have a valid account (therefore, username/password). They must enter either a valid existing username or password with an unmatching adjacent username/password.
POST CONDITION(s)	A course director is prompted to enter their log-in details again.
MAIN PATH	A course director enters the wrong username/password relative to the account they're attempting to access at the username/password stage of the log-in protocol.
ALTERNATIVE PATH	N/A
VIEW STUDENTS	
TRIGGER	A course director selects the 'claims' option from the course director page header.
SCENARIO	A course director wishes to view all active claims and all their associated details, by all registered students on the system.

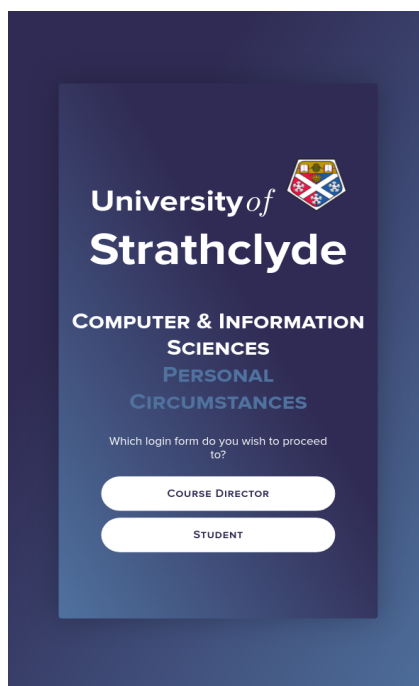
PRECONDITION(s)	A course director must be logged-in.
POST CONDITION(s)	A course director can view all students who have active claims.
MAIN PATH	A course director lands on this page after log-in.
ALTERNATIVE PATH	They select the 'claims' option from the course director page header. This is available from both the 'claims' and 'search' pages.
SEARCH STUDENT	
TRIGGER	A course director selects the 'search' option from the course director page header.
SCENARIO	A course director wishes to search for a specific student (via their student ID) in order to view their active claims and all associated details.
PRECONDITION(s)	A course director must be logged-in.
POST CONDITION(s)	A course director can display active claim details for any student of their choice.
MAIN PATH	A course director lands on the 'claims' page after log-in. They select the 'search' option from the course director page header. They input a student's ID. They submit the request using the submit search button.
ALTERNATIVE PATH	N/A
VIEW CLAIM DETAILS	
TRIGGER	A course director selects 'view' the option under the details heading from within a particular claim row.
SCENARIO	A course director wishes to view the additional text which was submitted by students under their claim details, when creating the claim.
PRECONDITION(s)	A course director must be logged-in. They must be on the 'claims' page. Or: They must be on the 'search', where results have been generated by student ID input and search submission.
POST CONDITION(s)	A course director can view the the additional text. They can select the view option again to hide the additional text.
MAIN PATH	A course director lands on the 'claims' page after log-in. They select the 'view' option under the details heading from within a particular claim row.
ALTERNATIVE PATH	A course director lands on the 'claims' page after log-in. They select the 'search' option from the course director page header. They search for a particular students claims using their student ID. They select the 'view option' under the details heading from within a particular claim row.
ORDER CLAIMS	
TRIGGER	A course director selects the an option from the order claims selection.
SCENARIO	A course director wishes to order active claims for a specific result in descending order (newest first) (requirement), or ascending order (oldest first) (non-requirement).
PRECONDITION(s)	A course director must be loggen-in. They must be on the 'search', where results have been generated by student ID input and search submission.
POST CONDITION(s)	A course director can display active claim details for any student of their choice, and choose to order the claims in an ascending or descending fashion.

MAIN PATH	<p>A course director lands on the ‘claims’ page after log-in.</p> <p>They select the ‘search’ option from the course director page header.</p> <p>They input a student’s ID.</p> <p>They submit the request using the submit search button.</p> <p>They select an option to sort the claims for the chosen student in ascending or descending order.</p>
ALTERNATIVE PATH	N/A
LOG-OUT	
TRIGGER	To course director wishes to log-out of their account.
SCENARIO	A course director wishes to terminate their browsing of students’ personal circumstance claims.
PRECONDITION(S)	A course director must be logged-in to the system (meaning they are on the main site pages, not the log-in stages).
POST CONDITION(S)	A course director is returned to the log-in page (select account type step) and has the option to leave the site or to log-back-in.
MAIN PATH	<p>A course director is on any page of the main course director system (i.e. not the login stages).</p> <p>They select the ‘log-out’ button on the header.</p>
ALTERNATIVE PATH	N/A

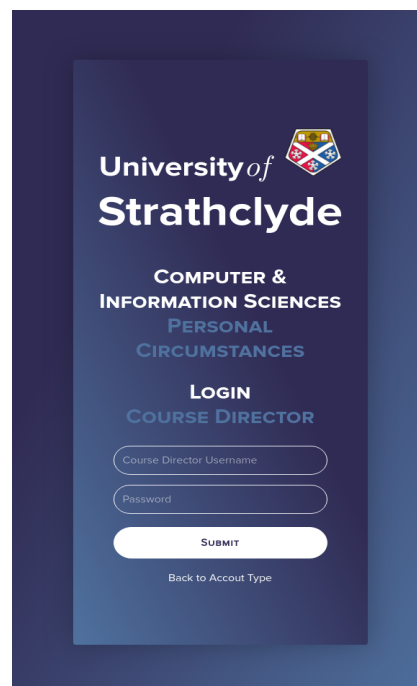
Table 2.3: Use Case Descriptions

3 Medium Fidelity Prototype

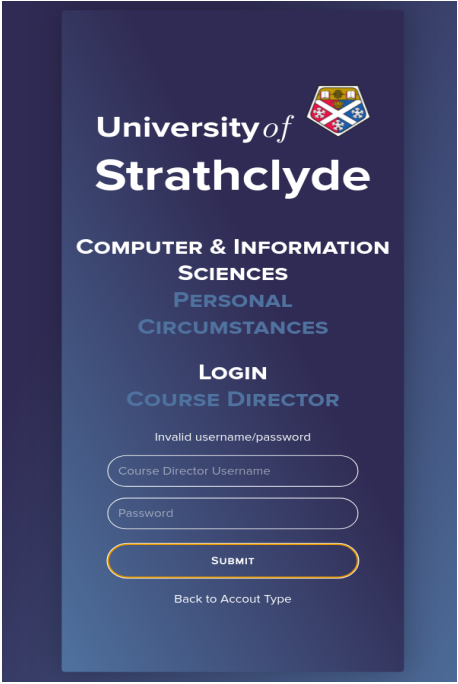
This medium fidelity prototype developed for this project makes use of HTML, CSS and JavaScript in order to deliver a basically functioning user interface which responds in a way which would be reflected by the final application. However, it doesn't relay or fetch any database data. Data used in this example comes from basic HTML and JavaScript generations. Note that screenshots may be skewed / out of proportion as they are scaled to fit in equal rows and columns in a nice, neat L^AT_EX table. For the sake of continuity and clarity, all use cases are presented here, not just three.



LOG-IN (STUDENT/COURSE DIRECTOR)
Basic login page.



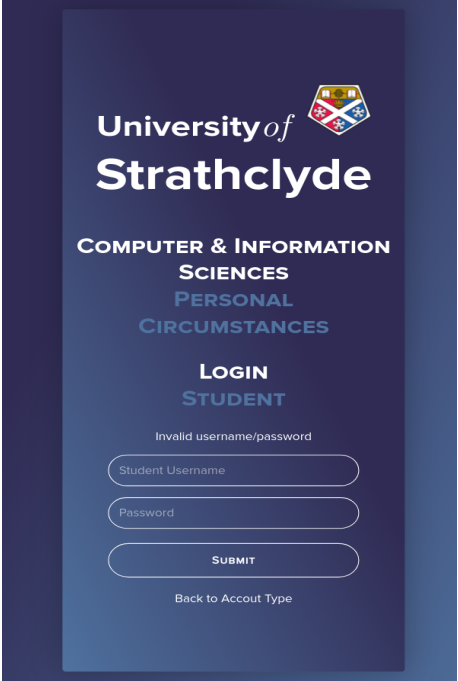
LOG-IN (COURSE DIRECTOR)
After selecting log-in as course director.



INVALID USERNAME/PASSWORD (COURSE DIRECTOR)
Incorrect or no details entered.

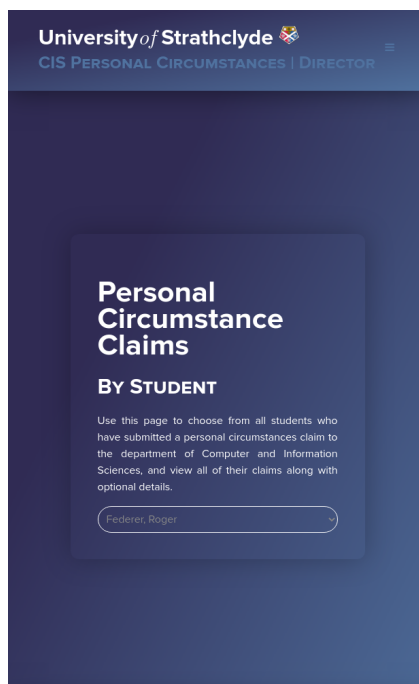


LOG-IN (STUDENT)
After selecting log-in as student.

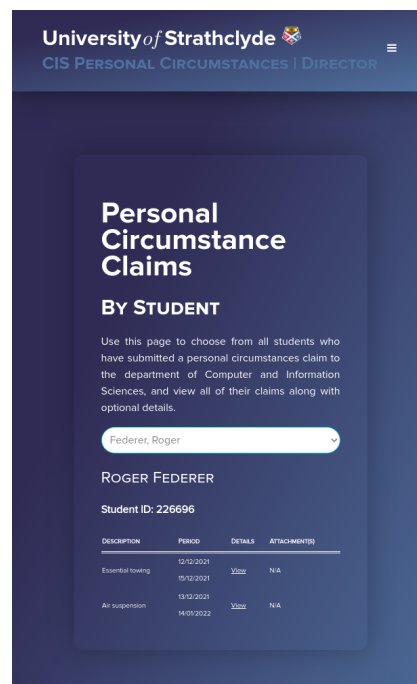


INVALID USERNAME/PASSWORD (STUDENT)
Incorrect or no details entered.

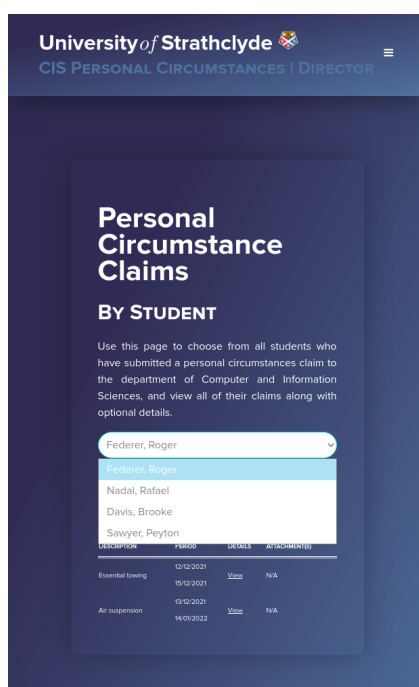
Table 3.4: Login Pages



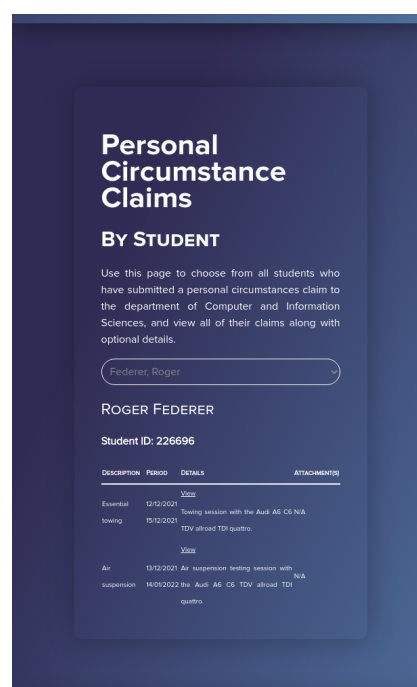
VIEW STUDENTS
Select student page.



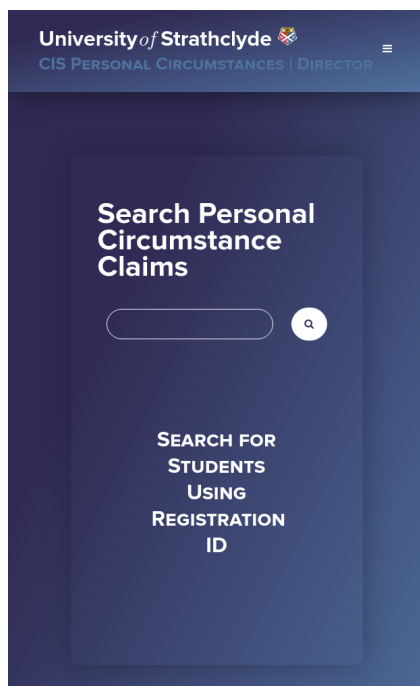
VIEW STUDENTS
Student selected from drop-down, details appear for 'Roger Federer'



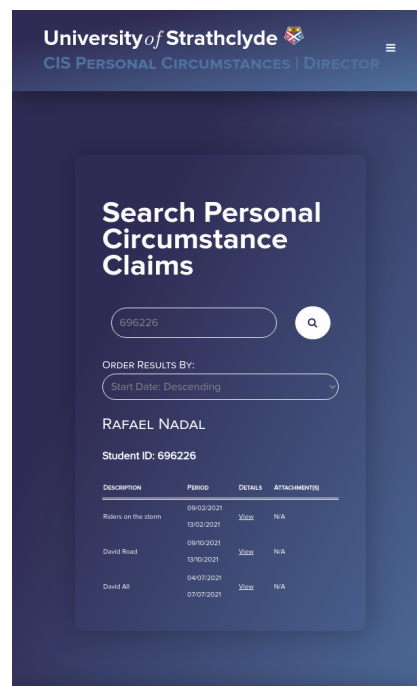
VIEW STUDENTS
Drop-down example.



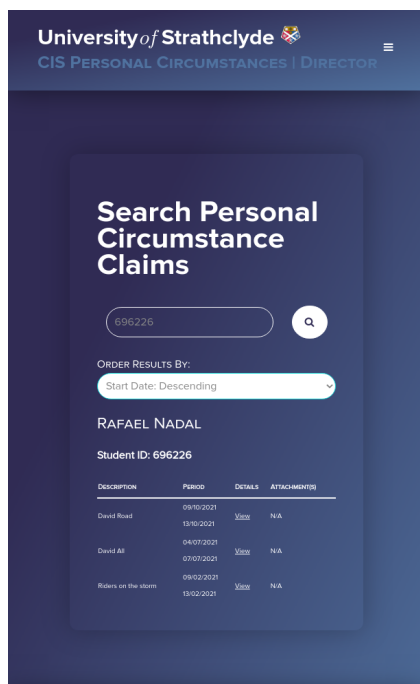
VIEW CLAIM DETAILS
Selected option to view additional details of Roger's claims.



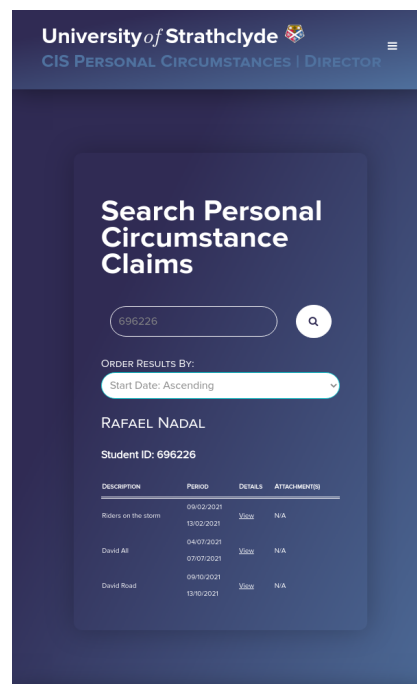
SEARCH STUDENT
Search student page.



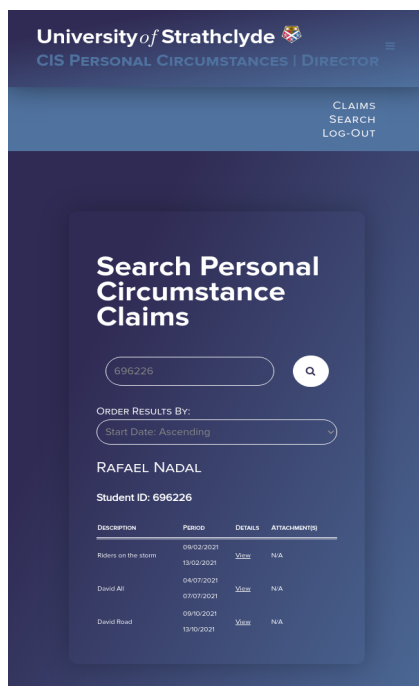
SEARCH STUDENT
Searched for '696226' and submitted using the search icon button. This resulted in 'Rafael Nadal's' claims being presented.



ORDER CLAIMS
Sort: descending by start date (latest first), from drop-down.



ORDER CLAIMS
Sort: ascending by start date (oldest first), from drop-down.



Example of page select division under header from 'hamburger' symbol.

Table 3.5: Course Director Pages

University of Strathclyde
CIS PERSONAL CIRCUMSTANCES | 696226

Your Claims

ACTIVE

DESCRIPTION	PERIOD	DETAILS	ATTACHMENTS
Riders on the storm	09/02/2021 13/02/2021	View	N/A
David Road	09/10/2021 13/10/2021	View	N/A
David All	04/07/2021 07/07/2021	View	N/A

EXPIRED

DESCRIPTION	PERIOD	DETAILS	ATTACHMENTS
Flying debris	01/01/2021 08/01/2021	View	N/A
Offloading in the Allroad	11/11/2020 13/11/2020	View	N/A
Watching One Tree Hill	04/09/2020 09/09/2020	View	N/A
Grassing bearings	16/08/2021 23/08/2021	View	N/A

VIEW CLAIMS

View active and expired claims page. Options to delete and edit claims.

University of Strathclyde
CIS PERSONAL CIRCUMSTANCES | 696226

Your Claims

ACTIVE

DESCRIPTION	PERIOD	DETAILS	ATTACHMENTS
David Road	09/10/2021 13/10/2021	View	N/A
David All	04/07/2021 07/07/2021	View	N/A

EXPIRED

DESCRIPTION	PERIOD	DETAILS	ATTACHMENTS
Flying debris	01/01/2021 08/01/2021	View	N/A
Offloading in the Allroad	11/11/2020 13/11/2020	View	N/A
Watching One Tree Hill	04/09/2020 09/09/2020	View	N/A
Grassing bearings	16/08/2021 23/08/2021	View	N/A

DELETE CLAIM

Claim record missing after use of delete button.

University of Strathclyde
CIS PERSONAL CIRCUMSTANCES | 696226

Edit Claim

TITLE / SHORT DESCRIPTION:
Riders on the storm

START DATE -- ASSUMED END DATE:
09/02/2021 13/02/2021

DETAILS:
Snoop Dog was in town with David All so I went to check out their two-way split 2004 Toyota Supra.

UPLOAD SUPPLEMENTARY DOCUMENT:
CHOOSE FILE No file chosen

SUBMIT CLAIM EDIT

EDIT CLAIM

Edit claim page, using edit claim button from 'Your Claims' page. Claim details copied as placeholders. Options to edit title, start date, end date, details, add file (input file), and submit.

University of Strathclyde
CIS PERSONAL CIRCUMSTANCES | 696226

Create New Claim

TITLE / SHORT DESCRIPTION:

START DATE -- ASSUMED END DATE:
dd/mm/yyyy dd/mm/yyyy

DETAILS:

UPLOAD SUPPLEMENTARY DOCUMENT:
CHOOSE FILE No file chosen

SUBMIT CLAIM

ADD CLAIM

Create new claim page. Options to input title, start date, end date, details, add file (input file), and submit.

Table 3.6: Student Pages

Bibliography

- [1] Nielsen, J. (1994). *Heuristic Evaluation*. Usability Inspection Methods, John Wiley & Sons