Evaluation

Evaluation of Test Results

During the programming of the program, I compiled my code constantly which helped identify errors which I solved as I was creating the solution. I believe that during programming I encountered several hundred small bugs, most of which were solved within seconds. Most problems were encountered with database access and manipulating data from the database. I also had to redefine some tables due to making mistakes when first creating them. In several cases, I had to invent workarounds to add certain functionalities.

I tested the navigation of my program which included testing all buttons and other controls. Every control lead to the correct action being performed, ensuring that the user can navigate the system fully. This navigational testing was very successful, every navigation control worked fully.

I also tested the interface of my program, checking for style consistencies and control locations. There were no spelling mistakes and all buttons etc. were in the correct place. This test was successful as well.

During the functional testing I encountered a few errors which I would not have found if not for the rigorous testing. One error was that when entering a long set of numbers into a textbox, the program would crash due to trying to convert the number that was too big into a 32 bit integer. This has since been fixed by adding a character limit to the text boxes.
The other error that was encountered was when entering a valid username but invalid password at the login screen, the user would correctly not be given access to the rest of the program but the error messagebox was not shown. This was due to a problem with where the else statement which contained the messagebox was located and has since been solved.

Despite these errors with certain data, the functional testing proved quite successful as most areas were without errors and all the errors that were identified have now been solved.

Satisfying Objectives

Objective	Is this objective satisfied	Evidence
Include multiple user accounts including admin accounts with basic password protection.	Yes. Multiple user accounts can be used. These accounts can either be admin or user accounts. Admin accounts have more features that user accounts.	LoginForm ViewUsersForm
Allow for new accounts to be created by an admin.	Yes. Admins can create user accounts and set them to be either user or admin level.	ViewUsersForm NewUserForm
Give admin accounts access to more options and controls than standard users.	Yes. Users are brought to the BuildingPlanForm and are limited to using forms that can be accessed from there. Users also don't have the option to	AdminMenuForm BuildingPlanForm

	manipulate rooms. Admins are taken to the admin menu upon logging in. From here they can access the BuildingPlanForm but also view the database tables and add new users. They can also manipulate rooms when on the BuildingPlanForm	
Be able to store and manipulate information about a large number of different rooms.	Yes. Multiple rooms can be added and the details of each room can be manipulated.	ViewRoomDefectsForm
Be able to store and manipulate information about several defects for each room. Using relational databases.	Yes. Each room may have multiple defects attributed to it.	ViewRoomDefectsForm
To perform validation on information entered by the users to preserve data validity.	Yes. All information entered by the user is validated with presence checks, type checks etc.	NewRoomForm NewUserForm NewDefectForm
Be able to sort and search data from the database. Searching will be implemented through filtering	Yes. Sorting and filtering data can be performed in three different forms.	ViewUsersForm ViewDefectsForm ViewRoomDefectsForm
Be able to create multiple reports which perform several calculations such as percentage of resolved defects.	Yes. Three reports can be created, percentage of resolved defects and various other calculations are performed.	ReportForm
These reports will sort defects so that defects linked to the same room are grouped together.	Yes. Defects for the same room are grouped together in all reports.	ReportForm
To include an interactive floor plan that will help to display information including room layout.	Yes. An interactive floor plan with each room in it can be displayed.	BuildingPlanForm
Each room on the floor plan will be moveable and resizeable in realtime.	Yes. Admin users can resize and move each room individually.	BuildingPlanForm

When manipulating rooms, information on rooms should be displayed on screen.	Yes. Clicking on a room will selected it and display its name, type, description and the number of defects it has.	BuildingPlanForm
New rooms can be added by admin accounts.	Yes. Admins can add new rooms.	BuildingPlanForm NewRoomForm
New defects can be added by all accounts.	Yes, users can add new defects	BuildingPlanForm NewDefectForm

Usability

I gave a questionnaire to four users of differing experience. They were asked to perform several tasks using my program and were then asked to rate how difficult the program was to use.

The questionnaire is copied below.

Task	1 (Very Difficult)	2 (Difficult)	3 (Average difficulty)	4 (Easy)	5 (Very easy)
Navigation					
Adding a new Defect					
Viewing a rooms defect					
Resolving a defect					
Adding a Room					
Printing a report					

Two members of my computing class completed the questionnaire (Jack and Anthony), they provide a good way to measure the usability of the program as they have a good idea as to what makes a good program.

A questionnaire was also completed by two inexperienced users (Daniel and Ādam) to gauge how difficult the program is to use for those with less computing experience.

	Navigation	Adding Defect	Viewing Defect	Resolving Defect	Adding Room	Printing Report
Jack Shergold	4	5	5	5	5	5
Anthony Wall	4	5	5	4	5	5
Daniel Beasley	5	5	5	4	5	5
Ādam Zaman	5	5	5	4	5	5

Jack said that sometimes navigation was slightly difficult as there were no clear "back" or "close" buttons on all forms. However navigation was still possible due to default close buttons at the top right of the form.

Anthony said that button labels were not always explicit in where they would lead. He found it can be difficult to immediately find out where to navigate for certain functions.

Daniel said that Resolving a defect did not work in all cases. He also found the user interface visually unappealing due to the lack of colour.

Ādam said that other room shapes should be available because some building complexes do not consist of purely square or rectangular rooms.

All the questionnaire scores were either 4 or 5 indicating that on the whole, the usability of the program is very high. The two main problems were found in navigation and resolving defects. Some found navigating to certain sections of the program slightly difficult and there were some problems with resolving but overall, feedback suggests that the usability of the system is very high.

Suitability

As my program has met all objectives, it is clearly suitable so far as it can perform the task for which it is required. But the program must also be fit for professional use. My program has a professional colour theme, with no bright colours and the layout is in a similar to style to other professional programs. The reports that my program generates are also in a professional style as they have been modelled on reports already used in the construction industry. My program is therefore very suitable and fit for purpose.

Performance

My program has performed well through testing, it handled almost all of the data it was given correctly. An error with accepting very long numbers has now been fixed. Calculations are also performed correctly. The system performs its required tasks fully and so I consider the program to perform successfully.

Future Improvements

My program is not a perfect solution for the problem and as such there are many things I would like to improve in the future.

Firstly, with the current system there is a bug that can cause an exception when the program is minimised on a certain form. I would like to fix this problem in the future as while it is not a massive problem, it can be annoying if continued use of the program is desired.

However, the main part of the solution I would like to change is the type of application produced. A much better solution for the problem would have been with a website based application. This would more easily allow multiple users to access the system and use it at the same time. It would also make it easier to preserver data consistency in the database that if the database was stored separately. However, due to knowledge and time constraints, I was not able to create a solution in this way.

In terms of improving the program itself, I would like to add an automatic backup and restore option to help improve the reliability of the system. I would also like to add an automatic updater to the system so I would be able to push updates to all copies of the program as long as the computer using the program is connected to the internet. This would allow for quick and easy updates/bug fixes.

The user interface could be improved with a more engaging colour scheme. While grey is professional, it makes the program rather uninteresting to use. Using a primary colour with two similar secondary colours may be a good way to make the program more visually appealing whist maintaining the professional look of the program.

More help could be provided to help guide the users in navigating the program. From feedback, it was suggested that it can be difficult to find the right controls to perform actions in the program. Increasing the use of tooltips and other help systems would make the system easier to use.

Another feature to improve the user interface would be to make the controls of a form change size when the form is maximised or the size of the form is changed. Other resizing options would be good to include also such as allowing the resizing of a table so as to view more data at once.

Security could be improved by the use of encryption in the storing of password. Currently, passwords are stored as plain text in the database which is very insecure. With better knowledge, I would implement this feature.