

**Module Handbook for Individual Project  
Academic year 2023/24**

**Module code:** IP40

**Level of study:** 6

**Number of credits:** 40 credits

**Course/s the module belongs to:** BA/BSc General Modular Scheme: Undergraduate Computing Suite

**Faculty:** Faculty of Science, Engineering and Social Sciences

**Semester/Trimester of delivery:** Semester 1 and 2

**Start date of the module:** Sept 2023

**Location of study:** Canterbury Campus

**Study hours for the module:** 400, Divide into:

- 12 hours academic direction
- 388 hours practice learning & independent study

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## **1. Welcome**

Welcome to the module Individual Project at Canterbury Christ Church University. This module is part of the Undergraduate Computing Suite offered within the School of Engineering Technology and Design. The accompanying Programme handbook can be found on the Computing All Years General Blackboard.

## **2. Module aims**

The Individual Project module uses the Conceive Design Implement Operate (CDIO) educational framework utilising software engineering fundamentals within the context of conceiving, designing, implementing and operating complex value-added real-world computer systems. The module makes use of active learning tools such as project work and problem-based learning, thus equipping computing students with improved technical knowledge along with improved communication and professional skills. This module is the culmination of a student's learning experiences on the entire programme and as such projects will reflect the programme's title, aims and learning outcomes. It requires the development of a significant sized software artefact and production of a formal report describing and critically appraising its development. The software artefact must meet a clearly identified real-world need, ideally for, a clearly identified business/customer/organisation/end user. It is expected that local businesses /organisations will continue to provide suitable projects, as is the case for the current Individual Project 40 module which this module will eventually replace. All the deliverables associated with the development/subsequent use of the software artefact must be submitted and students' will be required to give an informal demonstration of the finished product. Thus this module aims to provide students with an opportunity to individually manage, analyse, design, program and test a good quality, reliable and maintainable significantly sized system using a specified software development life cycle/development methodology, again, of their own choice in a timely fashion. It provides a context for the unification, consolidation, analysis, synthesis, integration and further development of the knowledge and practical skills cultivated elsewhere in the programme as well as an opportunity for both creativity and innovation. Finally, this module has been developed with reference to the British Computer Society (BCS) Guidelines on Course Accreditation. This module supports all elements of the CDIO model.

## **3. Module learning outcomes**

By the end of this module students should be able to:

1. demonstrate an ability to pursue a significant sized piece of academic study which is self-directed and meets a real need;
2. synthesise information, ideas and practices to provide quality products/solutions;
3. investigate an existing system, if any, (critically appraising its effectiveness, quality, usability, etc.), specify the requirements for a replacement system and then design, test and implement a fully documented, reliable and maintainable software artefact to meet those requirements, in a timely fashion;
4. recognise, critically discuss and demonstrate an understanding of and take appropriate action regarding social, professional, legal, ethical and risk/safety issues relating to the area of study as appropriate;

5. critically analyse, evaluate and discuss all aspects of their completed Individual Project including its theoretical, technological, financial, commercial and organisational context, along with any implications for future work, as appropriate.

Given the cumulative nature of students' learning experiences, the unifying nature, the size and the duration of the Individual Project module many of the Learning Outcomes detailed above cannot readily be achieved in the other modules in the programme.

#### **4. Indicative Module Content**

All Individual Projects must address a clearly identified real world need, ideally for a clearly identified business/customer/organisation/end user, rather than a project with no clearly identified business/customer/organisation/end user and/or for the student's own use and/or amusement. Projects that do not involve the whole software development lifecycle (i.e. from analysis through to programming and testing) will not be permitted. All projects must involve student written code in addition to generated program code, if any, and/or others' code, if any. It must be stressed that, while this module may involve some research, the primary aim is to produce a software artefact. Thus projects involving student research only or projects involving minimal production of software to support/validate/illustrate, etc. student research will not be allowed.

The topic for an Individual Project may be found/chosen by students themselves and detailed in a Project Initiation Document (PID) which will be the subject of the Year 2 Software Engineering module assignment. The PID will subsequently be approved by the project supervisor. The supervisor will, with the aid of other members of the department as necessary, consider any relevant professional, legal, ethical or social issues as appropriate, consider any risks and/or safety aspects as appropriate and ensure that the project reflects the programme's title, aims and learning outcomes. The supervisor may, in exceptional circumstances, decline approval for a proposal or require changes to the PID. The PID will not contribute to the final mark for this module.

In general the module will involve: investigating an existing system, if any; determining the requirements of a new system; designing and implementing a software artefact; testing the software artefact; producing a user guide and writing a formal report regarding the development of the entire system. To support these activities the module will also involve the use of (CASE) tools, project management procedures/tools, etc. as appropriate.

It is not possible to be prescriptive or detailed about specific module content because independently chosen projects and their development in terms of subject, software development lifecycle, development methodology, (CASE) tool/s, language/s, etc. will be variable. In general terms, however, students will all submit a formal report, a software artefact and all the deliverables associated with the production of that artefact. The formal report will be submitted in the specific format specified in the module handbook.

To assist in the whole process pertinent material will be presented in lectures/seminars at appropriate times throughout the course of the academic year. Thus, for example, project management will be covered early in the academic year while, for example, when it is expected that students would normally be undertaking, say systems design, then this area will be reviewed/developed during a lecture session. Other areas that will be covered will include professional/legal/ethical/social issues, project management, writing up, etc.

## 5. How the module is taught

This module will use the CDIO educational framework within the context of developing value-added real-world computer systems within a modern software engineering environment. This makes use of active learning tools such as project work and problem-based learning, thus equipping computing students with improved technical knowledge along with improved communication and professional skills. Individual Projects must meet a clearly identified real-world need, ideally for, a clearly identified business/customer/organisation/end user. It is expected that local businesses /organisations will continue to provide suitable Individual Projects as is the case for the current Individual Project 40 module which this module will eventually replace.

Students undertaking the Individual Project module will have undertaken the Year 2 Software Engineering module AND either the Object-Oriented Programming in C# module OR the Database Enhancement Group Project module OR the Web Development Project module These, along with other Year 2 modules, will provide a sound basis to proceed.

To ensure that students begin working on their project in a timely manner and are moving forward in the right direction, the deliverable associated with the analysis stage of the software development life cycle will be submitted, at the latest, by the end of Semester 1. This submission will be reviewed and formative feedback provided within three weeks of submission. This submission will not contribute to the final mark for this module.

The module primarily involves independent learning under the overall guidance (normally totaling 6 hours) of a supervisor. There will, nevertheless, be a number of formal lectures and seminars (normally totaling 6 hours) at regular intervals throughout the academic year. The purpose of which is to provide appropriate material at the appropriate time to all students while additionally helping to maintain focus, enthusiasm, momentum and direction. In addition, seminars on specific topics may be organised as required. The main guidance to individual students will, however, be provided during individual tutorials with their supervisor.

Our main online learning and teaching tool is Blackboard - <https://learn.canterbury.ac.uk/>. Help on how to use the different tools/apps offered in Blackboard can be found via the Blackboard HELP tab.

An extensive Individual Project module handbook (updated annually) will be available on Blackboard to students. This will contain a large amount of detail/advice on the Individual Project module generally and will include details about project selection, administrative procedures, supervision, milestones, assessment criteria and detailed requirements regarding the submission's content, required format, layout, etc.

You will be expected to attend meetings with your supervisor (details of which must be included in Appendix E of your submission). The frequency of such meetings should be responsive to progress and are likely to be more frequent in the early/latter stages of the IS. Do make appointments: it is not wise to rely on just being able to turn up and knocking on an office door. The use of e-mail for making appointments is strongly encouraged. At these meetings you will be expected to provide documented evidence of the work you have been doing and, if appropriate, demonstrate the current state of your software, if any.

Your supervisor will (and you must assume this to be the case) almost certainly not be an expert (or perhaps have any knowledge whatsoever) on all/some of the aspects of your IS. This does not matter

as the job of the supervisor is primarily to provide general guidance and support. Other members of staff may possibly be available to give specific help and advice as required.

**The duties of the supervisor include:**

- helping you decide and refine/modify on the scope of your IP
- helping you to produce a plan of work for the IP
- checking on the progress that you are making throughout the IP
- being available to provide informed discussion and guidance about the IP
- advising on the content and style of the IP.

**They do not include:**

- guiding every minute detail of your work
- reading and checking the whole IS before you hand it in
- being an expert or having any knowledge whatsoever regarding your specific IP.

**Attendance**

It is strongly recommended you attend the seminars and not just because **attendance is compulsory** (see the University policy which can be accessed @ <https://cccu.canterbury.ac.uk/student-support-health-and-wellbeing/policies-and-procedures/policies-and-procedures.aspx>). There are many studies linking attendance to attainment i.e. those that attend succeed.

## 6. Teaching schedule

**Semester 1 Schedule**

Learning Week	Week Commencing	Topic	Activity
1	25/09/2023	Welcome back to students for Level 6 / final year of study	Communication to students to advise them to submit their Individual Study Proposal before the deadline – Friday 6 <sup>th</sup> Oct.
2	02/10/2023	<b>Lecture1: Introduction to the Module</b>	Proposal Submissions Deadline for IP Proposals – Friday 6 <sup>th</sup> Oct.
3	9/10/2023	First supervisory meetings to take place	Confirmation of student – staff allocations
4	16/10/2023	<b>Lecture 2: Project Management</b>	
5	23/10/2023		
6	30/10/2023		
7	6/11/2023		
8	13/11/2023	<b>Lecture 3: Literature Review</b>	
9	20/11/2023		
10	27/11/2023		
11	4/12/2023	<b>Lecture 4: Poster</b>	Students to be advised on how they should approach

		<b>Preparation &amp; Presentation Skills</b>	their assessed poster presentation, its purpose, and what they can expect to receive in terms of feedback. Students to also be advised on how to make use of feedback from their presentation to enable them to enhance their final dissertation submission.
12	11/12/2023		
	1/01/2024	Study Week	
	8/01/2024	End of Semester Assessment Period	Poster (progress) presentations to take place
	15/01/2024	End of Semester Assessment Period	Poster (progress) presentations to take place

## Semester 2 Schedule

Learning Week	Week Commencing	Topic	Activity
1	29/01/2024		
2	5/02/2024		
3	12/02/2024		
4	19/02/2024	<b>Lecture 5: Research Data</b>	
5	26/02/2024		
6	4/03/2024		
7	11/03/2024	<b>Lecture 6: Dissertation Writing</b>	
8	18/03/2024		
9	25/03/2024		29/03/2023 Easter break
	8/04/2023	Easter break	
10	15/04/2023	Learning and Teaching week	
11	22/04/2023	Learning and Teaching week	
12	29/04/2024	Learning and Teaching week	
	6/05/2024	Study Week	
	13/05/2024	End of Semester Assessment Period	Final meeting with research supervisor to discuss the student's submission prior to marking.
	20/05/2024	End of Semester Assessment Period	Final meeting with research supervisor to discuss the student's submission prior to marking.

## 7. Assessment & Feedback

Formative feedback on the IP will be provided by the supervisor through meetings, emails etc. Summative feedback will be provided through the marking of the two assessment components as following (detailed guidelines for assessment preparation can be found in section 8):

Assessment Name	Assessment Type	Percentage of Module	Word Equivalence	Deadline
Poster Presentation	Individual Poster	15%	1,500	5/01/2024
Study	Dissertation	85%	8,500	10/05/2024

The Individual Project module must be passed without compensation or condonement in line with British Computer Society Course Accreditation Guidelines.

The Individual Project module will require students to submit a complete project in the form of a formal report, a software artefact and all the deliverables associated with the production of that artefact. In addition, students will provide a poster presentation and give a short informal demonstration of their software to their supervisor, second marker and their peers. The demonstration gives the student the opportunity to demonstrate their projects in the best possible light. In addition the demonstration will be used by the supervisor and second marker to seek clarification on students' Individual Project submissions and to examine the dynamics of the software artefact concerned. While no marks will be awarded directly for the demonstration it will, of course, have an impact on the final mark.

To allow for the wide variation in projects undertaken students will be allowed, during the early stages of the Individual Project module, to develop, in conjunction and agreement with their supervisor, their own marking scheme. A number of detailed 'off the shelf' marking schemes (including a default) will be available in the module handbook to suit some of the more predictable types of Individual Project.

Each submission is marked by two members of staff namely your supervisor and another member of the staff (the second marker). The second marker's job is to provide a 'second opinion' on the IS from the point of view of somebody who only sees the finished product and has no prior knowledge of it. In some cases, an IS submission will be marked by a third marker and all Individual Studies will, of course, be open to the scrutiny of the External Examiner. The assessment will carefully balance the quality and quantity of what has been attempted and achieved.

The assessment of the IS module is based on various criteria, including the following:

- have you achieved what you set out to achieve?
- has your work been organised sensibly?
- have your results been well presented?
- how well do you understand what you have done?
- do you have some critical perspective on your work?

The Poster presentation will be marked on Content; Layout and Design; Presentation and defending. The marking scheme details can be found in this Blackboard.

The Digital Artefact will be marked in two parts, namely Part A: Development and Part B: Submission

**Part A: Development (15% of the total marks available)**

This part is marked solely by the supervisor using the headings under Part A of the marking scheme details of which can be found in this Blackboard (Bb).

**Part B: Submission (85% of the total marks available)**

This part is marked by both the supervisor

and the second marker using the headings under Part B of the marking scheme details of which can be found in this blackboard (Bb).

## Marking Schemes

### Default Marking Scheme

The default marking scheme, which is suitable for a database Individual Project 20, implemented in Access/Oracle (with or without a Web based front end) details of which can be found in this Bb. The default marking scheme is available for your use but you are not, however, obliged to use it. Note that there are also available a number of alternative pre-prepared marking schemes, including 3GL and Agile, (details of which can be found in this Bb) that you might choose to use.

### Alternative Marking Schemes

It is fully recognised that Individual Project 20 projects are likely to vary considerably in both scope and ambition. You may add, remove or alter headings given in the Default, 3GL or Agile marking schemes as well as their relative weightings. If you want to use a marking scheme other than the Default, 3GL or Agile marking scheme then it must be agreed with your supervisor and included in your PID. Note that a marking scheme that differs significantly from the Default, 3GL or Agile marking scheme is unlikely to be acceptable unless there are very good reasons. For example, for an Individual Project 40 that is relatively straightforward but requires significant algorithmic skills then the weighting given to the "quality of implementation" could justifiably be increased. As another example, for a task that involved significant analysis of the current system and significant analysis/design of the required system then the weighting could justifiably shift towards "Systems Analysis" and "Systems Design". Marking schemes that, in the opinion of the supervisor, are deliberately designed to either enhance the student's mark or eliminate the need to seriously tackle part/s of the software development life cycle or are otherwise unacceptable will not be allowed.

There is no alternative marking scheme for Poster.

***Note that if you do not provide a marking scheme for your Individual Study then the default marking scheme will automatically be used to mark your Individual Study.***

## 8. Learning activities

### Organising Your Time

Hofstadter's law:

"It always takes longer than you think even when you take into account Hofstadter's law"

The key to success in the IS module is to ***plan a programme*** of work and then stick to that plan. Bear in mind that some activities can overlap. You should prepare your plan of work in consultation with your supervisor, who will help you to make realistic estimates of how long various tasks might take.

***It is very easy to under-estimate how long tasks will take.*** Allow contingency time in your schedule so that things like illness, unexpected machine failure or time-scale overruns do not totally ruin your



schedule. ***Specifically do not assume that the University computing facilities will be available during University vacations especially the Christmas vacation.***

It is often difficult to stick to a plan of work because, as you acquire greater knowledge and expertise, you will probably think of other approaches to the problem or extra features that you would like to add into your IS. In general, however, ***do not*** be tempted to diverge from your plan of work. Any changes that it becomes absolutely necessary to make to your RP, must, ***in all cases***, be agreed upon with your supervisor. Such changes are to be recorded and must be included (as Appendix C) in your IS submission (see below).

***It cannot be stressed enough how important it is to work steadily rather than rely on spasmodic spurts of activity.*** Past experience has shown that:

- when students come under personal and/or academic pressure during the academic year then it is normally the IS module that suffers resulting in underachievement in this course.
- attempts to complete the bulk of an IS shortly before the hand in date almost always results in underachievement in this module.

It is suggested that you keep a (digital or otherwise) project diary. Such a diary may help you monitor your progress and will be a very useful source of material for the IS submission. Your diary could include entries on:

- the order in which activities were tackled
- how long activities took
- problems
- ideas
- notes
- reminders
- reasons for certain actions
- printouts
- rough sketches/diagrams
- summary notes of tutorials with your supervisor
- summary notes of tutorials with any other member of staff who you may have approached for specialist help
- summary notes of meetings you may have with outside bodies/individuals
- problems, if any, with the software/hardware if any
- etc.

It is important not to let these become a jumble. Always date and annotate all of your entries. It might be useful for you to record your diary using specialised software (although a word processing package will, of course, suffice). A small paper or digital diary may also be useful for those thoughts that spring to mind, for example, while travelling to university on the train.

### **Progress Reports**

In the outside world, those responsible for any sizeable project are expected to report on the progress of their work at regular intervals in order to show interested parties that the work is progressing according to schedule and to identify any serious problems before they become unmanageable. Your supervisor will normally ask you to provide a number of progress reports at various stages of your IS.

### **Lectures/Seminars**

A number of lectures/seminars of varying length will be presented throughout the duration of the IS module. THESE SESSIONS ARE NOT OPTIONAL AND A REGISTER WILL BE TAKEN. THE PURPOSE OF THESE SESSIONS IS TO HELP YOU THROUGH THE IS MODULE AND AS SUCH, IT IS IN YOUR BEST INTERESTS TO ATTEND.

#### **E-mail**

You will occasionally be e-mailed regarding the IS module. ***It is assumed that all such e mail is read, understood, and sensibly acted upon.***

#### **Security, Etc.**

Regardless of whether you are using one of the University's computer systems, your own computer or someone else's computer you must back-up all your work every 24 hours (or more frequently if appropriate). You will receive no sympathy/consideration or allowance made for claims that "my hard disk crashed, and I lost all my work", etc.

If you are making use of software that is run other than on one of the University's computer systems, then you must ensure that the software concerned can be re-installed if required.

Any files relating to your IS that are held on one of the University's computer systems must not be removed until 1 January in the year following submission.

If you use types of hardware and/or software that the University does not support, then it is your responsibility to make sure that such hardware and/or software is robust.

## **9. Assessment Preparation Guidelines**

### **Individual Project Submission Requirements**

Part of the purpose of the Individual Project is to test your ability to work to a schedule and adhere to basic project management procedures. You should aim to submit your IS ahead of time and you should try to always be in a position to do so.

It is possible that unfinished Individual Studies could, of course, still be awarded good marks. You are required to submit:

- ***your entire Individual Project 40 as a single .docx file via Turnitin using the following descriptors:***
  - Assignment Title:**  
STU-<Your Full Name>\_Individual\_Project\_40
  - Document Name:**  
STU\_2019-20\_Individual\_Project\_40\_<Your Full Name>
- ***In case your Individual Project 40 includes program code, save as a single .zip file via Blackboard named:***  
DSS\_2019-20\_Individual\_Project40\_<Your Full Name>

TURNITIN will be used for originality/plagiarism checking. You will be allowed to upload your document as many times as you like until the submission date to perform your own plagiarism check in addition to the checking that will be performed by tutors marking your assignment. For further help and guidance on TURNITIN submissions go to the Blackboard HELP tab. The guidance includes an overview of TURNITIN, a guide to using TURNITIN through blackboard and information relating to copyright and data protection which you MUST read so that you understand your rights.

For further help and guidance on Blackboard submissions go to the Blackboard HELP tab.

#### Important notes regarding the submission:

- When you submit your work via TURNITIN/Bb you will receive an automatic email receipt.
- You will be allowed to submit your project after the submission deadline. Note, however, that the usual penalties will apply.

#### **Note that:**

- ***No copy of your Individual Project 40 will ever be returned regardless of the circumstances. As such, you are advised to make adequate secure digital and/or hard copies of any material that you might need access to in the future for whatever reason. AS SUCH, PLEASE DO NOT REQUEST THE RETURN OF YOUR INDIVIDUAL Project 40.***
- ***Digital and/or hard copies of your Individual Project 40, or parts thereof, may be made available to other students, individuals, and organisations after it has been marked.***

You are responsible for getting your Individual Project 40 submission prepared. To re-iterate, “my hard disk has been corrupted” are not acceptable as excuses for late submission of an Individual Project 40.

Finally, it must be stressed that the standard of reporting in an Individual Project 40 submission should be high, and the quality of presentation is important.

#### Hints on Style

The IS submission should be more a description/discussion of what you have achieved and how you achieved it rather than a narrative about how you struggled through.

Some points to consider follow:

- An ***academic style*** of writing ***must*** be adopted. Academic writing refers to a particular formal style of expression, encompassing strong composition, excellent grammar, and a consistent stylistic approach. Characteristics of academic writing include a formal tone, use of the third person rather than first-person perspective, clear focus on the issue/topic rather than the author’s opinion along with word choice avoiding jargon, slang, and abbreviations. It is very easy to resort to informal writing since it’s easier and much more familiar. Characteristics of informal writing are the use of colloquialisms/jargon, writing in the first person, making “I” statements, making direct personal statements and imprecise word choices/statements. Some examples might help to illustrate these points.

#### ***Example 1: 'I think he's a loser.'***

This statement is informal. The writer speaks in the first person, using the word “I” and states an opinion, employs the slang (and derogatory) term “loser” and uses the contraction “he’s”. No justification is made for the writer's assertion. If this were in the middle of a paragraph, it might be easier to understand to whom the author is referring. Taken as a simple statement, however, it’s impossible to know whether the writer thinks Ed Yourdon, the writer's friend, the writer's neighbour's cat, or a particular footballer is a loser!

***Don't ever use the word “I”. Your IS should always be written in third person.***

***Example 2: 'Yourdon's apocalyptic pronouncements that the, so called, millennium bug could lead to protracted economic depression/technological breakdown or even the collapse of civilization has dented his credibility significantly.'***

This example uses an academic, formal style typical of what is expected of you at undergraduate level. Written in the third person, the sentence omits references to the author and focuses on the issue. Strong, specific adjectives like “apocalyptic” convey the author’s view clearly without resorting to slang.

***Example 3: 'According to Smuffit (2009) Yourdon's pronouncements that the, so called, millennium bug could lead to protracted economic depression/technological breakdown or even the collapse of civilization has dented his credibility significantly.'***

This example again uses an academic, formal style typical of what is expected of you at undergraduate level. Written in the third person, the sentence again omits references to the author and focuses on the issue. In this example, however, the author references the renowned expert Smuffit and thus adds a considerable amount of weight to his/her argument.

- Your IP submission should be well structured and easy to follow. So, before starting, decide exactly what it is **you** are trying to say. A useful technique here is to divide each chapter into sections and subsections before you start writing, to map out how the argument of the chapter is going to proceed, and in the light of this to decide exactly what each section is going to contain. If you find that you are repeating large blocks of material in two different places, stop and think again about the structure of your narrative.
- Don't be too verbose, but at the same time, don't be too brief. Regard your audience as the second marker who may know nothing about your application but is nevertheless well versed in the generally. Feedback from other students can be helpful here.
- If you want to quote some material from another source it is sometimes better to quote it directly rather than to attempt to rewrite it in your own words **but make sure you give the appropriate reference to the original source**. This rule does not apply, however, if the amount you want to quote is longer than, say, a paragraph. In this case you should summarise what your source has to say and then refer readers to the original for more detail. In modern academic writing it is conventional to keep references gender neutral.
- Define jargon, specialised/technical terms, and acronyms (computer or otherwise) when you first use them; if your IS submission includes a lot of (unavoidable) jargon, specialised/technical terms and acronyms (computer or otherwise), then include a glossary.
- Do not assume that the reader has any specialised knowledge of the area that you are describing and be sure to explain any technical terms that you use in a separate glossary.
- All acronyms must be written in full within brackets after the first occurrence of the acronym in your report. If the same acronym is used repeatedly then include it in the Glossary.
- A good way of discovering whether your writing is at the right level is to get somebody else on your course to read a sample chapter or two; they will have some general background knowledge, but they will not be familiar with your specific topic area.

- You should not clutter the main chapters with large amounts of technical/other detail that would interrupt the flow of the main chapters. Such material should be relegated to the appendices.

### **Guidance for poster demonstrations**

You are required to give a poster demonstration on Poster Presentation Day (TBC). This will take place as specified in Teaching Schedule section above for submission dates. Such poster demonstrations are not optional and failure to attend will be penalised. Your supervisor, second marker and others will present and question you.

The poster demonstration serves two main functions. Firstly, you will be asked to give informal but nevertheless comprehensive demonstration of your research. Secondly, you will be expected to show that you fully understand all the material you have submitted. You may, for example, be asked to expand on areas that you have not fully covered in your submission, to give more justification of your decisions that you have made or to describe the trials and tribulations that you suffered while undertaking the Individual Project.

### **Guidance for submission of written documents to TURNITIN**

For further help and guidance on TURNITIN submissions go to the Blackboard HELP tab. The guidance includes an overview of TURNITIN, a guide to using TURNITIN through blackboard and information relating to copyright and data protection which you **MUST** read so that you understand your rights.

### **Guidance for submission to the Blackboard Upload tool**

For further help and guidance on Blackboard submissions go to the Blackboard HELP tab.

### **Guidance for Late Coursework in the BA/BSc and GMS Scheme**

Across the BA/BSc and GMS Scheme late coursework is penalised. Please see your **Programme Handbook** for more detailed guidance.

### **Guidance for students who fail a module**

After all assessments for the module have been taken, the Programme Board of Examiners will usually meet to make final decisions on individual student marks. Marks will also be moderated by an external examiner as outlined in your Programme handbook. The external examiner also sits on the meeting of the Programme Board of Examiners, referred to as the Examination Board.

Your **Programme handbook** will provide details of the grading system

The decision of the Programme Board of Examiners will be communicated to you by means of a Notification of Results/Resits letter.

### **Data Protection/Ethics**

All submissions must adhere to the Data Protection Act (1998). Adherence to this act is *your* responsibility. Your supervisor will provide guidance where appropriate. All personal data must be omitted and/or aggregated and/or anonymised, as appropriate, to ensure that no individual can be identified from it. ***The University will not, under any circumstances, accept any Individual Project submission that fails to comply with this requirement and will return such submissions to the candidate for amendment.***

All submissions must adhere to the specified ethics requirements in particular those detailed in the University's Research Governance Handbook (<https://cccu.canterbury.ac.uk/research-and-enterprise-development-centre/docs/Ethics-papers/ResGovFwk-2015.pdf>). Such adherence is *your* responsibility. Your supervisor will provide guidance where appropriate. ***The University will not, under any circumstances, accept any Individual Project module submission that falls foul of this requirement and will return such submissions to the candidate for amendment.***

## 10. Recommended Reading

### Core text

- Christian Dawson (2015) *Projects in Computing and Information Systems: A Student's Guide* (3rd ed.), Pearson Higher Education, ISBN-10: 1292073462

### Background reading

The bibliography will be determined by the nature of the Individual Project undertaken and possibly in consultation with the supervisor. A very generalised bibliography is given below.

- Baase, S. (2012) *A Gift of Fire: Social, Legal, and Ethical Issues for Computing Technology* (4th ed.), Pearson
- Bott, F (2014) *Professional Issues in Information Technology* (2nd ed.), British Computer Society
- Northcutt, S. (2004) *IT Ethics Handbook: Right and Wrong for It Professionals*, Syngress Media
- Reiss, G. (2013) *Project Management Demystified: Today's Tools and Techniques* (2nd ed.), Routledge
- Pears, R. and Shields, G. (2013) *Cite them Right: The Essential Guide to Referencing and Plagiarism* (9th ed.), Palgrave Macmillan
- Bell, J. (2010) *Doing Your Research project: A Guide for First-Time Researchers in Education, Health and Social Science* (5th ed.), Open University Press
- Cryer, P. (2006) *The Research Student's Guide to Success* (3rd ed.), Open University Press
- Dancey, C (2011) *Statistics Without Maths for Psychology* (5th ed.), Prentice Hall
- Dawson, C. (2007) *A Practical Guide to Research Methods: A User-friendly Manual for Mastering Research Techniques and Projects* (5th ed.), How To Books
- Fink, A. (2009) *Conducting Research Literature Reviews: From the Internet to Paper* (3rd ed.), Sage

### Recommended Websites

There are many web sites, newsgroups, and conventional journals that students can use to support this module on a general level. An appropriate selection of these will be provided each academic year. For the most part, however, the relevance of individual web sites, newsgroups and conventional journals will be determined by the nature of the Individual Project undertaken and possibly provided by the supervisor. A very generalised list of websites is given below.

- *Canterbury Christ Church University Intellectual Property Policy – Students*. Available from: <https://cccu.canterbury.ac.uk/research-and-enterprise-development-centre/docs/Intellectual-Property-Policy-Students.pdf>
- *Canterbury Christ Church University Research Governance Framework*. Available from: <https://cccu.canterbury.ac.uk/research-and-enterprise-development-centre/docs/Ethics-papers/ResGovFwk-2015.pdf>
- *British Computer Society (2012) Guidelines on Course Accreditation - Information for Universities and Colleges*. Available from: [http://www.bcs.org/upload/pdf/hea-guidelinesfull-2012\\_1.pdf](http://www.bcs.org/upload/pdf/hea-guidelinesfull-2012_1.pdf)

### **Recommended Journals, Newspapers and Magazines**

There are many journals that can be used to support this module on a general level. For the most part, however, the relevance of individual journals will be determined by the nature of the Individual Project undertaken.

## **11. Additional Information**

Students MUST read this module handbook in conjunction with:

- A. the Programme Handbook(s) available on the student administration Blackboard for your Programme (combined Honours students will need to look at Handbooks for both halves of their degree- similarly students taking a module that is delivered by a Programme other than their own);
- B. Academic skills information on <http://www.canterbury.ac.uk/students/support-services/develop-your-learning/develop-your-learning.aspx>

Most of what you need to know about your degree, rules, and procedures, where to find help and so on can also be found via your student portal as

<https://portal.canterbury.ac.uk/campusm/home#menu>

**Note: In the event of any change to the teaching or assessment schedule, students will be notified formally via an announcement on Blackboard and an email sent using the university email address as shown on Blackboard.**

## Appendix 1: Required Format for IP 40 Module Submissions

The content/format of the Individual Project 20 submission is **not optional** and must be as detailed overleaf, containing as a bare minimum **all** the sections and **all** the appendices detailed in the order given. No other format is acceptable. You may, of course, add additional sections and/or appendices as appropriate. Failure to conform to these requirements will result in a loss of marks.

NOTE THAT WITH REGARD TO TECHNIQUES, NOTATION AND DIAGRAMS WHENEVER POSSIBLE USE THAT COVERED ON THE COURSE. SO FOR EXAMPLE THE NOTATION USED FOR AN ERD (ENTITY RELATIONSHIP DIAGRAM) ON THE COURSE WAS THAT USED WITHIN SSADM. IF YOU DRAW AN ERD USE THIS NOTATION RATHER THAN, SAY, CHEN, YOURDON, IDEF1X, BACHMAN, MARTIN, IE (INFORMATION ENGINEER- ING), INFOREM, ETC.

No marks will be awarded for the:

- PID
- formative submission within this module.

Only material presented in the final submission will be eligible for marks. So, in your final submission don't write things like 'see PID/formative submission' as a substitute for presenting the appropriate material within your submission.



## Title Page

There must be a title page and it must contain the following information in *exactly* the following format:

**FAO <your supervisor's name>**

**Computing, Digital Forensics and Cybersecurity**

**BSc (Hons.) <Your full course name><sup>1</sup>**

**<The Applicable Academic Year e.g. 2021-22>**

**IP 40**

**Title: <Your IS 40 Title>**

**Author: <your full name>**

**Supervisor: <your supervisor's name>**

**E-mail: <your University e-mail address>**

This report is submitted in partial fulfilment of the requirement for the BSc in <**your degree title**> at Canterbury Christ Church University

I declare that this report is my own original work containing no personal data as defined in the Data Protection Act (1998) and that I have read, understood and accept the University's regulations on plagiarism/intellectual property rights/research ethics (in particular the Research Governance Handbook) and the IS 40 Module Handbook.

Further, I accept that digital and/or hard copies of my Individual Study 40, or parts thereof, may be made available to other students, individuals and organisations after it has been marked.  
Finally, I accept that no copy of my Individual Study 40 will ever be returned regardless of the circumstances.

**Signed <your signature >**

**Date of Submission: < your submission date >**

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<sup>1</sup> <...> above, of course, indicates that you should substitute your own **appropriate** text.

## **Abstract**

The **abstract** very briefly summarises the problem tackled, the method adopted and the results obtained. There must be an abstract and it must be no longer than 300 words, is single-spaced and appears on its own separate page. The abstract should be made as self-contained, concise and readable as possible. The abstract is the first thing that the examiners read, so be sure to create a good impression.

## **Acknowledgements**

Acknowledgements of all help received from others must be included. If no help was received from others than a statement to this effect must be included.

## **Contents**

A table of contents, *including all appendices*, together *with* page numbers. The Contents appears on a separate page.

## **List of Figures<sup>2</sup>**

This list should contain the number, title and page number of each figure. If there are no figures in your submission then the List of Figures can be omitted. The List of Figures appears on a separate page.

## **List of Tables**

This list should contain the number, title and page number of each table. If there are no tables in your submission then the List of Tables can be omitted. The List of Tables appears on a separate page.

## **Introduction Chapter**

The introduction chapter should describe the Individual Project 20 in greater detail. It will set the scene and locate the Individual Project 20 in an academic/commercial/organisational framework, discuss the issues surrounding the Individual Project 20, describe any previous work undertaken (by others and/or possibly yourself), identify the need for the present work, give reasons for the topic chosen, briefly describe the development methodology/software development life-cycle adopted, briefly detail the modelling techniques employed, briefly outline the contents of the following chapters, provide a clear statement of the aims and objectives of the Individual Project 20 and provide an overview of what was attempted along with an over- view of what was actually achieved.

The Introduction chapter:

- should be as self-contained and readable as possible
- will set the tone for the whole of the submission and should be written with care and attention to detail
- is one of the first things that the examiners read, so be sure to create a good first impression

## **Main Chapters**

The (main) chapters following the introduction chapter are often the first written and can be planned and/or produced while work on the Individual Project 40 is progressing. You will often learn more about your Individual Project 40 while writing it up than at any other time as various loose ends become apparent. Do not assume that the reader has any specialised

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<sup>2</sup> Conventionally, tables are referred to as “tables”, while anything pictorial (e.g. graphs, diagrams, photographs, etc.) is called a “figure”. Thus, for example, the first figure in Chapter 2 would be numbered “Figure 2.1”. Tables and figures should of course be given appropriate titles such as “Survey Results” or “Context Diagram” respectively.

knowledge of the area that you are describing and be sure to explain any technical terms that you use in a separate glossary. A good way of discovering whether your writing is at the right level is to get somebody else taking this module to read a sample chapter or two: they will have some general background knowledge, but they will not be familiar with your specific topic area.

You must include in these chapters a clear justification for all the strategic/technical decisions you made during the course of the Individual Project 40. So, for example, if you chose a particular development methodology, chose specific modelling techniques, decided to model an enterprise making use of subtypes, decided to de-normalise a set of tables, chose/developed a particular algorithm or menu structure, decided to use a particular software tool, decided on the use of classes/objects, chose a particular class structure, chose to develop the Individual Project 20 in a specific way, etc. then you must discuss these issues here. You should not, however, get bogged down with all the actual deliverable detail here, which should be placed in the appendices. Thus the Current Environment Investigation Report (if appropriate), Requirement Specification, Design Report, Implementation, Testing, User Guide and Timeboxes (if using Agile software development) deliverables must all be included as appendices and not here. You should, of course, discuss such deliverables here.

### **Legal Considerations Chapter**

A separate chapter on legal considerations should be included, remembering that Data Protection Law and Computer Misuse Law could be appropriate here. If there are no legal considerations, then you must state this.

### **Ethical Considerations Chapter**

A separate chapter on ethical considerations should be included. Here, issues that are ethics related that are not necessarily legal related should be discussed. Information on ethics issues in general and specifically regulations/procedures in place at CCCU (e.g. those relating to research with human participants) relating to your work should be included. **If your work involves people then there will be ethical issues to consider.** If there are no ethical considerations, then you must state this

### **Conclusion Chapter**

The conclusion chapter should begin with an overview of all that has gone before, possibly emphasising earlier points which, at a later stage, turned out to be important. You must provide a critical evaluation of your Individual Project 20 which must include the details of what has, and has not, been achieved with reference to your PID and your Requirement Specification. Details of what has been learnt during the course of the Individual Project 20 and how this could be put to good use if a similar project was undertaken in the future should be described. Implications for future practice should be drawn, and directions for further work should be identified and any outstanding problems should be described. The conclusion chapter:

- should be made as self-contained and as readable as possible
- is possibly one of the first things that the examiners read, so be sure to create a good first impression
- is one of the last things that the examiners read, so be sure to leave them with the impression of an impressive and well-conducted Individual Project 40.

### **References**

All incorporated text, diagrams, graphics, pictures, illustrations, figures, proofs, tables and any other intellectual property (for example, designs, computer software, etc.) including that

in software, demonstrations, presentations, presentation materials (e.g. hand-outs, view-foils, Power- Point slides, etc.) produced by another person/s must always be acknowledged (even if you change them slightly).

If, in very exceptional circumstances, there are no references then you must state this.

**You must not copy any material whatsoever from other sources without proper acknowledgement. Such action will be considered plagiarism, which can result in the failure of this module.**

### **Bibliography**

If, in very exceptional circumstances, there is no bibliography then you must state this.

### **Appendices**

The appendices should contain, amongst other things, all the deliverables from your Individual Project 20 (for example, the Current Environment Investigation Report (if appropriate), Requirement Specification, Design Report, Implementation, Testing and the User Guide, Marking Scheme, Changes to the Project Initiation Document and Glossary, Timeboxes (if using Agile software development), etc. In general, any large amount of technical material that would interrupt the flow of the main chapters should be relegated to an appendix.

The contents and title of Appendices A – N is fixed and must be presented as detailed below regardless of the development methodology/software development lifecycle adopted. Do not under any circumstances use any of Appendices A – N for any other purpose than that specifically specified below. Failure to conform to these requirements will result in a loss of marks. Appendix E of your submission, for example, is for the Requirements Specification deliverable only and no marks will be awarded for the Requirements Specification deliverable other than for material contained in Appendix E of your submission. Discussion of the Requirements Specification deliverable, however, should be contained in the main chapters. Appendices in the range O - Z can be used for any purpose if required.

**Note that each appendix must be page numbered separately. For example, Appendix B of your submission must be page numbered B1, B2, B3, B4, B5, etc. and that no other style of page numbering is acceptable.**

### **Appendix A: Glossary**

Appendix A must contain nothing other than a glossary. If there is no glossary then Appendix A will simply contain the text "Deliberately Left Blank".

### **Appendix B: Marking Scheme**

Appendix B must contain nothing other than the marking scheme from your RP as originally signed off by your supervisor without any alterations. Alternatively, you can simply specify the Default Marking Scheme.

Note that if you do not specify a marking scheme then the Default Marking Scheme will automatically be used to mark your Individual Study.

### **Appendix C: Changes to the Project Initiation Document**

Appendix C of your submission must contain nothing other than all changes, agreed with your supervisor, to your PID after it has been signed off by your supervisor. If there are no changes to your PID then Appendix C will simply contain the text "Deliberately Left Blank".

## **Appendix D: Current Environment Investigation Report**

If you are using an Agile development method then Appendix D of your submission will simply contain the text "Not Applicable, see Appendices L, M and possibly N for Agile development method timeboxes."

Appendix D of your submission must contain nothing other than your Current Environment Investigation Report.

For example, a typical 'conventional' waterfall software development lifecycle using 'conventional' modelling techniques the Current Environment Investigation Report will include DFD/s (physical and logical), EPDs, an ERD, entity descriptions and details of the problems of the current system.

For example, a typical 'conventional' waterfall software development lifecycle using UML object modelling techniques the Current Environment Investigation Report would typically include high level Use Cases supporting use case diagrams and details of the problems of the current system.

If you believe that a Current Environment Investigation Report is not appropriate for your Individual Project 40 (i.e. there is no current system) then you must agree this with your supervisor. If a Current Environment Investigation Report is not appropriate for your Individual Project 40 (i.e. there is no current system) then Appendix D will simply contain the text "Not Applicable".

Appendix D is for the Current Environment Investigation Report deliverable only. No marks will be awarded for the Current Environment Investigation Report deliverable other than for material contained in Appendix D. Discussion of the Current Environment Investigation Report deliverable should be contained in the main chapters not here.

## **Appendix E: Requirements Specification**

If you are using an Agile development method, then Appendix E of your submission will simply contain the text "Not Applicable, see Appendices L, M and possibly N for Agile development method timeboxes."

Appendix E of your submission must contain nothing other than your Requirements Specification.

For example, a typical 'conventional' waterfall software development lifecycle using 'conventional' modelling techniques the Requirement Specification will include details of the functional requirements (i.e. DFD/s, EPDs, an ERD, entity descriptions) and the non-functional requirements (i.e. constraints and goals).

For example, a typical 'conventional' waterfall software development life cycle using UML object modelling techniques the Requirement Specification could include a functional requirement document, Use Cases (with a supporting use case diagrams), Conceptual Model (possibly supported by noun analysis), System Sequence Diagrams and Operation Contracts along with the non-functional requirements (i.e. constraints and goals).

Appendix E is for the Requirements Specification deliverable only. No marks will be awarded for the Requirements Specification deliverable other than for material contained in Appendix E. Discussion of the Requirements Specification deliverable should be contained in the main chapters not here.

## **Appendix F: Design Report**

If you are using an Agile development method then Appendix F of your submission will simply contain the text "Not Applicable, see Appendices L, M and possibly N for Agile development method timeboxes."

Appendix F of your submission must contain nothing other than your Design Report.

For example, a typical 'conventional' waterfall software development lifecycle using 'conventional' modelling techniques the Design Report will include a structure chart/menu map, module specifications and details of the file/database design.

For example, a typical 'conventional' waterfall software development lifecycle using UML object modelling techniques the Design Report will include interaction diagrams (sequence and/or collaboration diagrams) and class diagrams. You are encouraged to refer to GRASP patterns when developing the interaction diagrams.

Appendix F is for the Design Report deliverable only. No marks will be awarded for the Design Report deliverable other than for material contained in Appendix F. Discussion of the Design Report deliverable should be contained in the main chapters not here.

## **Appendix G: Implementation**

If you are using an Agile development method then Appendix G of your submission will simply contain the text "Not Applicable, see Appendices L, M and possibly N for Agile development method timeboxes."

Appendix G of your submission must contain nothing other than details about your Implementation. For example, a typical 'conventional' waterfall software development lifecycle using 'conventional' modelling techniques the Implementation will include program designs (if appropriate) and program listings.

For example, a typical 'conventional' waterfall software development lifecycle using UML object modelling techniques the Implementation will include algorithm designs for methods (using Structured English) and program listings for each of the classes.

Any generated code (e.g. a Microsoft Access .accdb file) should be listed in this appendix. All code that you have written yourself should be listed in this appendix.

Any generated code that you have amended yourself should be listed in this appendix.

If you have not written any code or amended any generated code, then a statement to this effect must be included in this appendix.

Appendix G is for the Implementation deliverable/s only. No marks will be awarded for the Implementation deliverable/s other than for material contained in Appendix G.

Discussion of the Implementation deliverable/s should be contained in the main chapters not here.

## **Appendix H: Testing**

If you are using an Agile development method then Appendix H of your submission will simply contain the text "Not Applicable, see Appendices L, M and possibly N for Agile development method timeboxes."

Appendix H of your submission must contain nothing other than details of your testing. This must include:

- a clear test strategy.
- a test plan including expected results. The test plan should be well structured in order to make it easy for the reader to quickly establish its completeness and comprehensiveness.
- a management summary giving an overview of tests that were not planned, tests that were not completed, tests that failed, outstanding problems, etc.

In addition, note that for OO testing, integration (final) testing is important but of equal importance is ensuring that a 'testing class and the associated test plan is used to test each class individually.

Appendix H is for the Testing deliverable/s only. No marks will be awarded for the Testing deliverable/s other than for material contained in Appendix H. Discussion of the Testing deliverable/s should be contained in the main chapters not here.

## **Appendix I: User Guide**

If you are using an Agile development method then Appendix I of your submission will simply contain the text "Not Applicable, see Appendices L, M and possibly N for Agile development method timeboxes."

Appendix I of your submission must contain nothing other than a User Guide. No marks will be awarded for the User Guide deliverable other than for material contained in Appendix I. Discussion of the User Guide deliverable should be contained in the main chapters not here.

## **Appendix J: Project Management**

Appendix J of your submission must contain nothing other than details regarding project management.

This Appendix should include the project plan documented in the form of, say, a Gantt chart (or possibly using CPM/PERT) clearly identifying the milestones for reviews and product delivery which should, of course, clearly link back to the methodology/software development life-cycle employed.

The appendix must also include details of on-going actual progress to date against the project plan along with how any divergence from the project plan was caused and subsequently dealt with.



Appendix J is for project management plans/actual progress only. No marks will be awarded for project management plans/actual progress other than for material contained in Appendix J. Discussion of project management plans/actual progress should be contained in the main chapters not here.

### **Appendix K: Meetings With Supervisor**

Appendix K of your submission must contain nothing other than details (e.g. date, time, location, purpose, description, actions, etc.) regarding all meetings with your supervisor.

### **Appendix L: Agile Development: Timebox 1**

If you are not using an Agile development method, then Appendix L of your submission will simply contain the text "Not Applicable."

Appendix L of your submission must contain nothing other than details regarding Time- box 1:

- Overview of scope, purpose and benefit to customer/user. Narrative on problem situation (current situation) to be resolved and functionality to be provided (Mo- SCoW) and how this enhances the situation.
- General Introduction to the Timebox Outlining:
  1. Prioritised Targets for the timebox.
  2. Description of the choice of Software Engineering artefacts to be produced in this stage e.g. Use Cases, Personas, User Descriptions, CRC cards, ER Diagrams, Class Diagrams, UI Content Diagrams, DFDs, UI designs, State Transition Net- works, Data Dictionaries, DB table designs, Object Diagrams, etc.
- Summary of Timebox Activity:
  1. Summary of (changes in) this timebox to system – Achievements and missing features.
  2. Changes to project plan in the light of development in this timebox.
- Conclusions:
  1. Summary of learning and achievement in this timebox.
  2. Reflection on the success of the work in this timebox – alternative actions/developments/techniques and their potential to have improved the delivery.
- User Guide, if appropriate – suggest a 'Minimal Manual format', as per Carroll (1987) – NOT just a small user manual.

It is important to note that the timebox MUST produce a fully documented and tested system with some useful functionality that the end user can work with. It is not an evolutionary prototyping method, where code can be produced that does not immediately produce useful functionality for the intended user.

### **Appendix M: Agile Development: Timebox 2**

If you are not using an Agile development method, then Appendix M of your submission will simply contain the text "Not Applicable."

Appendix M of your submission must contain nothing other than details regarding Time- box 2.

Submission contents will be as per Timebox 1 but modified to fit the improved system. There is no need to re-analyse situations that have not changed in the interim, or to show designs for parts of the system that have remained static. Analysis and design must be shown for parts of the system that are to change in this timebox.

### **Appendix N: Agile Development: Timebox 3**

If you are not using an Agile development method, then Appendix N of your submission will simply contain the text "Not Applicable."

Appendix N of your submission must contain nothing other than details regarding Time- box 3.

Submission contents will be as per Timebox 2 but modified to fit the improved system. There is no need to re-analyse situations that have not changed in the interim, or to show designs for parts of the system that have remained static. Analysis and design must be shown for parts of the system that are to change in this timebox.





## Appendix 2: Alternative Marking Criteria

The Individual Project 20 may be marked from an alternative perspective. This approach focuses on the work as a whole rather than a number of individual sections as detailed in the marking scheme.

A **First-Class** mark will be awarded if the following criteria have been met:

- the software has been thoroughly tested according to a well-documented testing strategy/-plan;
- a very high proportion of the requirements specified in the Requirements Specification/PID have been met and it is clear how these requirements have been processed at each stage of the lifecycle;
- excellent and perceptive documentation which:
  - includes an insight into the need for a methodology;
  - has an in-depth appreciation of the strengths and weaknesses of the both the software and the associated documentation;
  - provides clear evidence that a significant effort has been made to check for completeness and consistency;
  - is easy to read, easy to traverse and very well presented.
  - there are examples of the creative use of available resources;
  - at most a few minor errors;
  - an ambitious sense of purpose;
  - at demonstration(s) the candidate is able to:
    - demonstrate a fluency with the system they have written;
    - answer questions with the confidence that derives from a prolonged and detailed study of the underlying problems specific to the work presented and software development in general.

An **Upper-Second** mark will be awarded if:

- the software has been carefully tested based on a soundly structured, well documented test plan with very few errors and/or omissions;
- the objectives are adequately accounted for;
- the documentation:
  - includes an appreciation of the need for a methodology;
  - has an effective analysis of the strengths and weaknesses of the both the software and the associated documentation;
  - provides clear evidence that a serious attempt has been made to check for completeness and consistency;
  - is well structured and well presented.
  - there are no major mistakes and the work done is sound in most respects;
  - there are examples of the effective use of available resources;
  - there is a clear sense of purpose;
  - at demonstration(s) the candidate is able to:
    - demonstrate a fluency with the system they have written;
    - answer most questions with the confidence that derives from a prolonged and detailed study of the underlying problems specific to the work presented and software development in general.

A **Lower-Second** mark will be awarded if a significant part of the IS has been successfully tackled and well documented. Typically, the work will be characterised by:

- testing that is carefully documented but may not be exhaustive; a limited, but serious, attempt at implementing the agreed objectives, documentation that:

- includes an appreciation of the need for a methodology;
- has an adequate analysis of the strengths and weaknesses of the both the software and the associated documentation;
- provides clear evidence that a serious attempt has been made to check for completeness and consistency;
- is reasonably well structured and well presented.
- very few significant undocumented errors with the overall submission still sound in most respects;
- a good use of available resources;
- a performance at the demonstration(s) that leaves the examiners with a clear impression that the candidate has adopted a careful and considered approach to their work and has displayed a mastery over some of it.

A **Third-Class** mark will be awarded when there is a clear indication that the candidate is beginning to come to terms with the need for a methodical approach to software development and sound documentation. The candidate will probably have taken the opportunity at the demonstration(s) to elaborate convincingly on the failings of their Individual Project 20 . The submission will typically contain:

- a limited attempt at implementing the agreed work but with some parts of the work done well.
- documentation that is reasonably well presented, adequately organised and contains a competent analysis of the strengths and weaknesses.
- a moderate use of available resources.
- a minimal number of undocumented errors.

A **Fail** mark will mean that the student has not benefited from the exercise in any significant way. Individual Project 40 will indicate that the candidate has little appreciation of the level of work required at degree level and their performance at demonstration(s) will suggest/confirm that very little commitment has been made during the year. The submission will typically contain:

- poorly tested software that does not meet many of the user's requirements;
- disorganised and illogical documentation with very little rationale for the overall design;
- a limited use of available resources;
- a number of significant and undocumented errors;
- very little sense of purpose.