



SET10101 Software Architecture Coursework

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| Learning Outcomes Covered: | <p><i>LO1: Recognise major and emerging architectural styles and architectural patterns</i></p> <p><i>LO2: Specify and analyse components and connectors of a software system</i></p> <p><i>LO3: Generate architectural alternatives for a problem and choose between them</i></p> <p><i>LO4: Design and construct a software system that satisfies an architectural specification</i></p> <p><i>LO5: Design and analyse architectures in emerging contexts</i></p> |
| Assessment Type: | Report and Demo |
| Overall module assessment | 60% for Coursework, 40% for Exam |
| For this assessment: | 100% for the Coursework |
| Assessment Limits: | Report between 8 to 20 pages |
| Submission Date: | Friday 29 November 2024 |
| Submission Time: | 3pm |
| Submission Method: | Via Moodle |
| Turnitin: | Unlimited Attempts |
| Module leader: | Xiaodong Liu |
| Tutor with Direct Responsibility: | Xiaodong Liu |

- You are advised to keep a copy of your assessment solutions.
- Please note regulation Section B5.3.b regards component weighting.
- Late submissions will be penalised following the University guidelines as follows: Up to 5 working days late the grade will be capped at P1, and F5 after 5 working days.
- Extensions to the submission date may only be given by the Module Leader for exceptional circumstances. – by submitting appropriate request form from Extenuating circumstances.

- Feedback on submissions will normally be provided within three working weeks from the submission date.

The University rules on Academic Integrity will apply to all submissions. The student academic integrity regulations contain a detailed definition of academic integrity breaches which includes use of commissioned material; knowingly permitting another student to copy all or part of his/her own work

By submitting the report, you are confirming that:

- It is your own work except where explicit reference is made to the contribution of others.
- It has not been submitted for any module or programme degree at Edinburgh Napier University or any other institution.
- It has not been made with the assistance of Artificial Intelligence (AI) tools [except where and how as has been clearly stated].



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Hand Out Date : 8 October 2024

% Module Marks : 60%

Hand In Date : 3pm on Friday 29 November 2024

Local Contact : Xiaodong Liu

Room C55

0131-455-2747

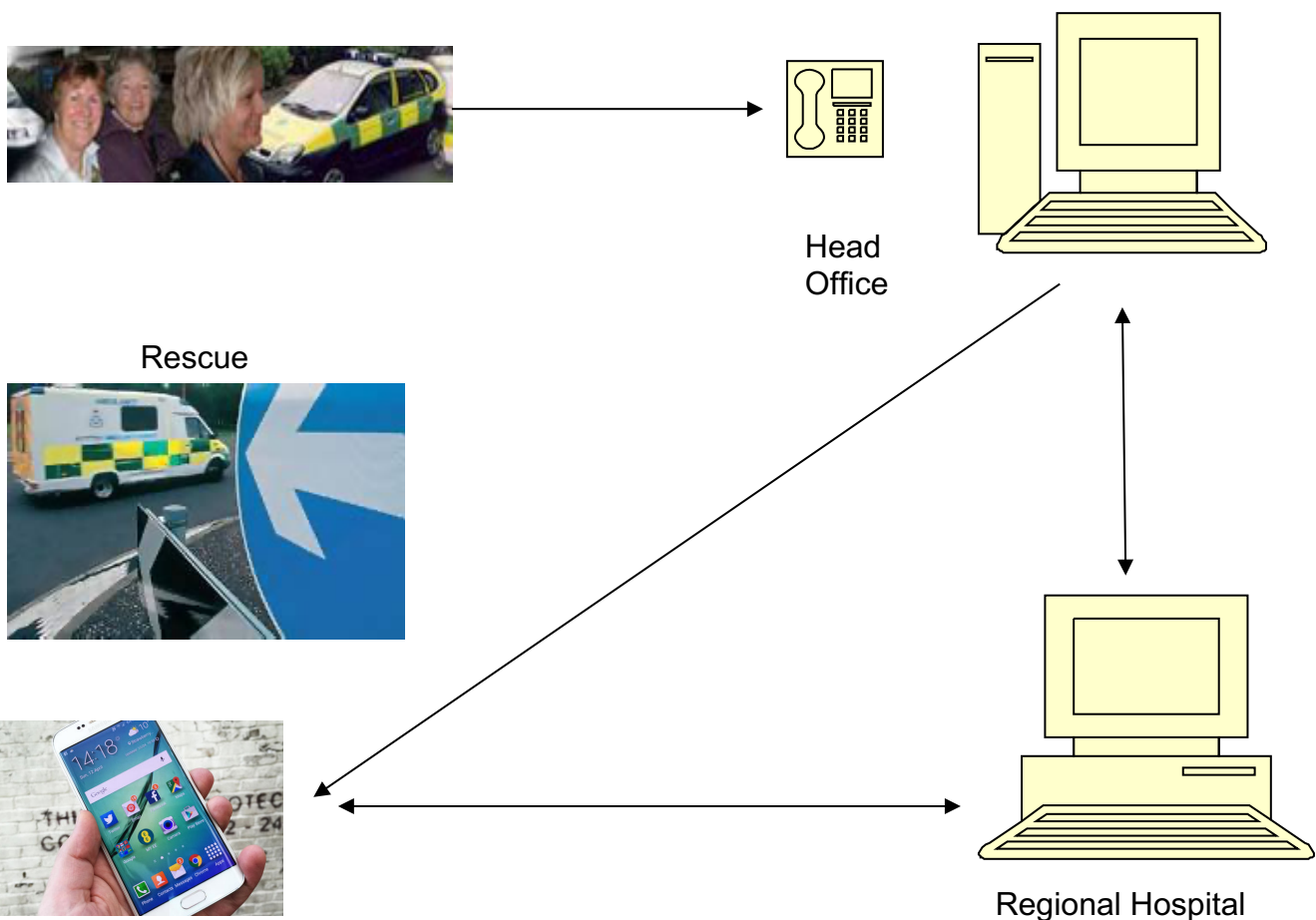
x.liu@napier.ac.uk

Description

An ambulance service (such as the Scottish Ambulance Service

<http://www.scottishambulance.com/> or the London Ambulance Service

<http://www.londonambulance.nhs.uk/>) would like to update its command and control system and link this information to an existing database of medical records. It has named the proposed system KwikMedical.



In particular when an emergency call is received the telephone operator, based at the organisation's headquarters, will enter information such as patient name, NHS registration number, address and medical condition into KwikMedical.

The system will check this information against its existing patients' medical database. KwikMedical will work out the best way of helping the patient and generate an ambulance rescue request to one of 20 regional hospitals, and send details to the hospital's computer system.

KwikMedical will then extract the patient's medical records from the patients' medical database and send the medical records to a smart phone located in the ambulance.

The regional hospital will also run a version of the KwikMedical System and will update the patient's record with the call-out details (e.g. who, what, when, where, any action taken and length of time spent on the call) as soon as the allotted ambulance has entered these details into his mobile device.

It is hoped that the **additional information** will help them make more efficient rescues and provide data to support strategic decisions about their regional hospitals.

The patients' medical database is **currently accessed via SQL**.

Eventually **it is hoped** that KwikMedical will interface to the global positioning systems (GPS) **fitted to the rescue vehicles** to facilitate location-based functions.

Please note that **KwikMedical is a DISTRIBUTED system**. You are supposed to use the appropriate architecture styles and technologies you've learnt to develop an effective solution, such as **client/server**, **peer to peer**, service-oriented, three-tiered, etc. KwikMedical is expected to be an expandable and adaptive system to accommodate changing business requirements in the future.

Hints: you can use **simulation** to implement the **mobile device**.

You should make a pitch to win this contract as follows:

1. Make a recommendation for **two** architectures that could be adopted, explaining the components and connectors and the protocol for information exchange.
2. Select one of the two candidate architectures and justify your choice in terms of the **quality attributes** you would expect it to possess.
3. Design and develop a prototype which will demonstrate the principles of the system. For example, you could establish an outline system with prototype components and connectors. This would then be used to demonstrate your competence when you pitch for the contract.
4. Evaluate your system. Try to **reassure the company** that the completed version will exhibit the quality attributes you identified in 2.

Submission Guidelines

S1. Software Architecture Specification Your first chapter should contain your discussion on the two architectures you have considered (1) and your reasons for selecting one to develop into a prototype (2). Subsequent chapters should include design (3) of your full system and your evaluation (4). This document should be no less than 8 pages in font size 12, including diagrams. Feel free to use more pages if you need – we don't set an upper page limit but make sure you only put the relevant material into your report.

S2. Source Code Please submit all the source code of your prototype via the Moodle coursework submission link. Please note that only a prototype is required but you should try to make its system structure as full as possible (3).

Zip your report together with your source code into one file and submit the file to the Moodle coursework submission link.

S3. Demonstration. You will be required to demonstrate your prototype in the D2 lab at your normal practical slots in week 12 and Week 13. For students who have exceptional reasons to be on-campus (e.g., health problem, travelling), please contact the module leader; we may then make special arrangement for you – e.g., online demo. Please note that this is only applicable for exceptional circumstances as the university required.

Marking Schedule

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| <u>S1 Software Architecture Specification</u> | <u>60 %</u> |
| i) Description of the two architectures you have considered | 15% |
| ii) The reasons for your selection of one of the architectures to develop the system | 15% |
| iii) The design of your full system | 20% |
| iv) The evaluation of your design and implementation | 10% |
| <u>S2 Implementation</u> | <u>30 %</u> |
| i) Functionality delivered by your prototype | 20% |
| ii) Quality features delivered by your prototype | 10% |
| <u>S3 Demonstration</u> | <u>10%</u> |
| <u>Total</u> | <u>100%</u> |

The coursework is designed to use your ability to generate architectural alternatives for a problem and choose between them (LO3), then design and construct a software system that satisfies an architectural specification (LO4, LO5). To a lesser extent LO1 and LO2 will also be implicitly covered. These will be explicitly covered in the exam.