**CP3407** ASSESSMENT TASK 1: **Project part-1**

This assessment task has been prepared by Dr Dmitry Konovalov for James Cook University. Updated 21 August 2017.

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|  |  |
| --- | --- |
| Group or individual | *Group. Every team member gets the same mark for this assessment item* |
| **Weighting / Length** | *20%* |
| **Due date** | 11-Sept-2017 (12noon, Monday of Week-7) |

## ASSESSMENT TASK DESCRIPTION

This task is the iteration-1 in terms of the Agile Software development (or Scrum sprint-1). It defines the initial project specifications including goals, deliverables, and planning for iteration-2 (alpha release, or Scrum sprint-2).

***Every team member gets the same mark for this assessment item***

The following is the list of items, which are required to be completed in this assignment. Maximum possible marks are given in brackets at the beginning of each item.

**[\_\_\_\_/Prerequisite for marking]** Assignment is submitted to LearnJCU electronically. **The same submission document for each member of your team**.

**[\_\_\_\_\_/20 marks] Team work.**

* GITHUB link: …
* Assignment is done in a group with 2-4 students.
* Student Name-1, Project role(s), specific individual contributions to this assessment item:
* Student Name-2: …
* Student Name-3: …
* Student Name-4: …

**[\_\_\_\_\_/20 marks] Project description for non-ICT-technical stakeholders and general audience.** Write here: minimum **TWO** pages, maximum **TEN** pages.

* *Justification for the project: Why a new ICT solution is required. Include some market and ICT technology research, plus available ICT solutions.*
* *Project goals: Describe exactly what and how your proposed ICT solution will be delivered to the lecturer for marking*.

<https://www.medtronic-diabetes.com.au/pump-therapy/what-is-insulin-pump-therapy>:

* Basal rate: regular injection rate based of what doctor thinks you need
* Bolus Dose: extra insuling to account for food etc. existing devices have bolus calculators that calculate required insulin based on settings your doctor sets up
* Provides better HbA1c control
* Fewer hypoglycaemic events
* Reduction in glycaemic variability
* Current personal insulin pumps don’t automatically calculate insulin requirements insulin injections must be manually calculated

# Project Description

Diabetes is a condition in which a person’s pancreas is unable to produce enough of the insulin hormone required to metabolise the sugar in their blood. Untreated, sufferers can experience a multitude of health issues including eye problems, kidney problems and death. Fortunately, diabetes can be managed by monitoring one’s BGL (blood glucose level) and administering insulin shots as required. As an alternative to the shots, a person with diabetes may instead opt to use an insulin pump. A typical insulin pump, is a device the size of a cell phone that can be configured by a medical professional with the user’s insulin requirements and administers the insulin in micro doses constantly throughout the day, closer mimicking the normal function of the pancreas. The pump itself consists of an insulin reservoir, a computer that can be programmed to control the pump, an LCD display to assist with programming the computer, a catheter which connects to the pump to deliver the insulin into the user’s body and a small motor that pumps the insulin. Currently, this system still requires the regular measuring of BGL and manual adjustment of the pump accordingly, it also doesn’t account automatically for food, with users still needing to calculate required insulin based on the calories they are about to eat and manually have the pump administer the extra insulin required. Our solution brings the insulin pump closer to replicating the natural function of the pancreas. As can be seen from *Figure 1* the hardware schematic for the pump we will be controlling includes a sensor, this sensor will provide accurate data on the user’s BGL allowing us to have the controller calculate automatically what amount of insulin the user requires.

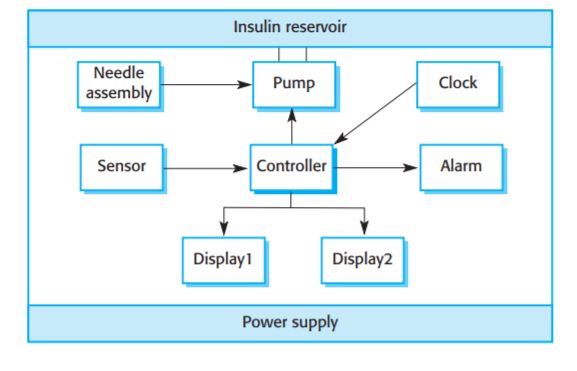


Figure . Insulin pump hardware schematic

# Project Goals

Our project is to develop the software that will control an insulin pump as per the hardware schematic in Figure 1. This software will then be run in a virtual simulation of the pump operation with a graphical user interface that displays the various responses of the pump software to different test data.

<http://iansommerville.com/software-engineering-book/files/2014/10/InsulinPumpOverview.pdf>

* Systems that automatically calculate and inject required insulin injections but developments in micro sensors mean in the future systems that do this might be available for personal everyday use.
* Blood sensor measures electrical conductivity of blood under different conditions which is proportional to blood sugar level

**[\_\_\_\_\_/20 marks3] Project Planning and scope.** Write here: Minimum **ONE** page, maximum **TEN** pages.

**Available days:** PASS-level (minimum) effort is 1-day and maximum is 3-days per teaching week (assume 12 weeks per study period), per team member. For example: 12 x 2 = 24 days is the minimum for a team with 2 students, 12x2x3=72 days is the maximum. The available days must match the SUM of your user story estimates below.

User story 1: title; (optional: short description only if title needs explanation); effort estimate (in days, maximum of 5 days).

User story 2: ...

**[\_\_\_\_\_/20 marks] Project Design.** Architectural (UML diagrams), Database, Interface designs. Minimum **THREE** pages, maximum **TEN** pages.

* Architectural design. Must use online UML diagram tool, e.g. https://www.gliffy.com/uses/uml-software/
* Database designs. Must use online tool, e.g. https://www.genmymodel.com/database-diagram-online
* Interface design. Must use prototyping tool, e.g. https://ninjamock.com/

**[\_\_\_\_\_/20 marks] Project development and release ICT infrastructure.** This must include development environment, programming languages, source code repositories (Configuration Management), project collaboration tools, and development tools. Write here: minimum **ONE** page, maximum **FIVE** pages.

* **Configuration Management**/version control, e.g. git, github (private repos only), heroku, bitbucket;
* **Prototypes are demonstrated to justify the proposed alpha-release**;

**ASSESSMENT TASK 1: CRITERIA SHEET**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Criteria** | **Exemplary (DISTINCTION-level)** | **Competent (CREDIT-level)** | **Marginal (PASS-level)** | **Unacceptable (FAILED-level)** |
| **Assignment is done in a group with 2-4 students.** | **20**  Group demonstrated **exemplary ability** to work collaboratively in github | **15** Group demonstrated **competent ability** to work collaboratively in github. | **10**  Group demonstrated **marginal ability** to work collaboratively in github. | **0-5**  Group did not demonstrated ability to work collaboratively in github. |
| **Project description for non-ICT-technical stakeholders and general audience** | **20**  Project is described **very clearly** for non-technical audience. No presentation and style errors | **15** Project is described clearly for a non-technical audience; or Outside page limits, or Minor presentation and/or style errors. | **10** Project is not described clearly. Outside page limits; or Major presentation and/or style errors. | **0-5**  Not done, or done unacceptably. |
| **Project Planning and scope** | **20**  All user stories are correct, and correctly estimated. | **15** Most user stories are correct, and correctly estimated. | **10**  More than half of user stories are correct, and correctly estimated. | **0-5**  Less than half of user stories are correct, and correctly estimated. |
| **Project Design** | **20**  Architectural, Database, Interface designs are correct and justified for IT audience | **15** Architectural, Database, Interface designs are mostly correct and justified for IT audience | **10**  Architectural, Database, Interface designs are somewhat correct and justified for IT audience. | **0-5**  Architectural, Database, Interface designs are mostly incorrect and/or not justified for IT audience. |
| **Project development and alpha-release ICT infrastructure** | **20**  Description very clearly communicates exemplary ICT solutions. | **15** Description clearly communicates competent ICT solutions. | **10**  Description communicates ICT solutions. | **0-5**  Not done, or done unacceptably. |