

An example of a critical system

- A personal insulin pump for people suffering from diabetes
- This will be used as an illustrative example throughout the course

Medical systems

- More and more medical instruments now include embedded control software.
- These software systems are often critical systems as a patient's life (or at least their health) may depend on the correct and timely functioning of these systems
- The systems themselves are often relatively small and are therefore understandable unlike, for example, industrial control systems

Diabetes

- People with diabetes cannot make their own insulin, a hormone that is normally secreted by the pancreas. Insulin is essential to metabolise sugar and hence generate energy
- Currently most diabetics inject insulin 2 or more times per day, with the dose injected based on readings of their blood sugar level
- However, this results in artificial blood sugar fluctuations as it does not reflect the on-demand insulin production of the pancreas

A personal insulin pump

- A personal insulin pump is an external device that mimics the function of the pancreas
- It uses an embedded sensor to measure the blood sugar level at periodic intervals and then injects insulin to maintain the blood sugar at a 'normal' level.
- I will draw on this example at various points in the course to illustrate aspects of critical systems engineering