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Software Engineering

http://proglang.informatik.uni-freiburg.de/teaching/swt/2005/

Exercise Sheet 8

Deadline: June 14th, 2005

Exercise 1 – Software Architecture: (10 points)
A cruise control is a mechanism which controls the speed of a car:
The driver can set a desired velocity. The cruise control measures the actual speed and and accelerates or brakes the vehicle to reach the desired velocity. If the driver brakes, the cruise control is automatically disabled.
Give a software architecture with which one can implement this cruise control.

Solution:
This problem is easily solved by using *Process Control*. We define:

Process Variables actual speed, brake (true/false, depending on the drivers action), throttle, terrain.

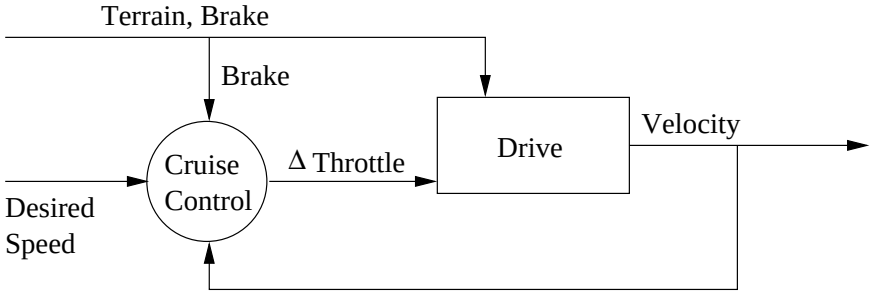
Controlled Variable actual speed

Input Variable brake, terrain

Manipulated Variable throttle

Set Point desired velocity

Additionally wie need an internal state representing whether the Cruise Control is activated or deactivated.
Since we control values it is a "Closed-Loop Control", and since we react on controlled variables as well as input variables we use a mixture of "Feedback" and "Feedforward" Control.
The architecture can be represented as follows:



The internal state can be set by the input variable "brake" as well as by external commandos.