Course Overview

`http://www.ee.nmt.edu/~rison/ee308`

Texts: **68HC12 Microcontroller: Theory and Applications**
Motorola Databooks on the 68HC12

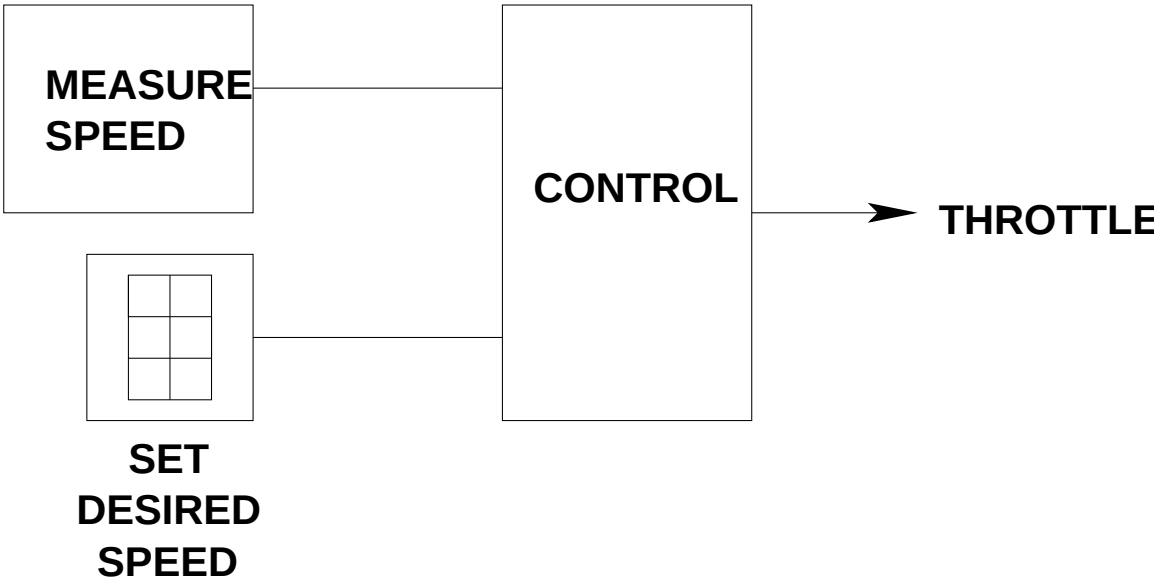
- Introduction to the 68HC12 Microcontroller
- Binary and Hexadecimal Numbers
- Assembly Language Programming
- C Language Programming
- Introduction to 68HC12 Internal Peripherals
  - The 68HC12 Timer Subsystem
  - Interrupts using the Timer Subsystem
  - The 68HC12 Pulse Width Modulator Subsystem
- The 68HC12 Expanded Mode
  - Address and Data Buses and Timing
  - Adding Memory and External Peripherals
  - Interfacing to the 68HC12
- More 68HC12 Internal Peripherals
  - The A/D Converter Subsystem
  - The Serial Peripheral Interface
  - The Serial Communications Interface
- Using the 68HC12 in a Control Application

Lab Overview

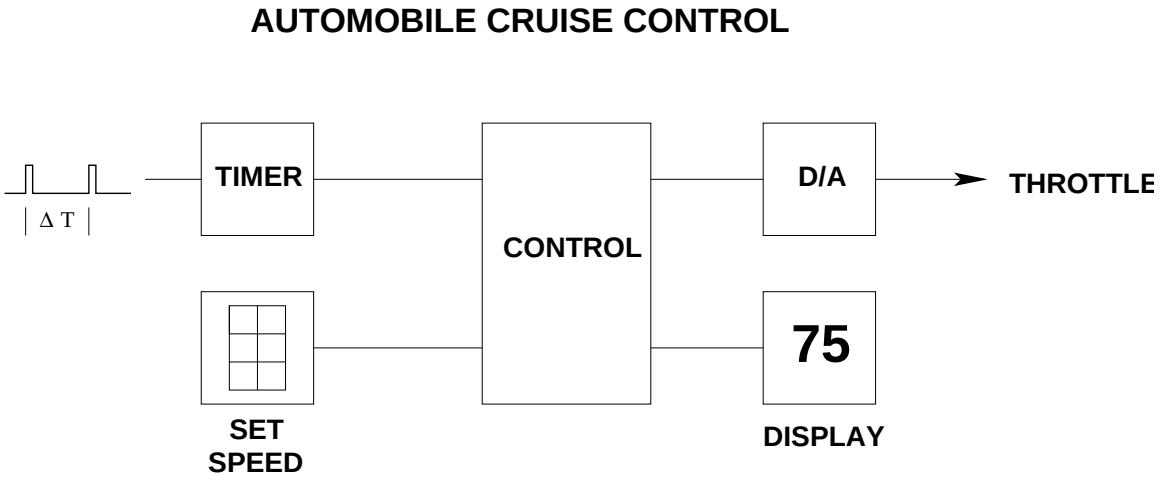
- The lab instructors are Dr. Stephen Bruder (Monday lab) and Dr. Scott Teare (Wednesday lab).
- Lab handouts will be posted on the EE 308 website:
  `http://www.ee.nmt.edu/~rison/ee308`
- You need to pick up a HC12 evaluation kit from the EE Secretary before the first lab.
- You need to bring a bound lab notebook to the first lab.
- There will be a prelab for each lab. This must be done and entered into your lab notebook at the start of your lab section. The lab TA will verify that you have completed the prelab.
- If you do not complete the prelab before coming to lab, you will lose 10% of the points for that lab, and you will not get out of lab until late.
- Do not cut up the lab handout and tape parts of it into your lab notebook. Write a short statement in your notebook explaining what you are doing for each part of the lab, and what your results are.

Block diagram of simple cruise control system

AUTOMOBILE CRUISE CONTROL



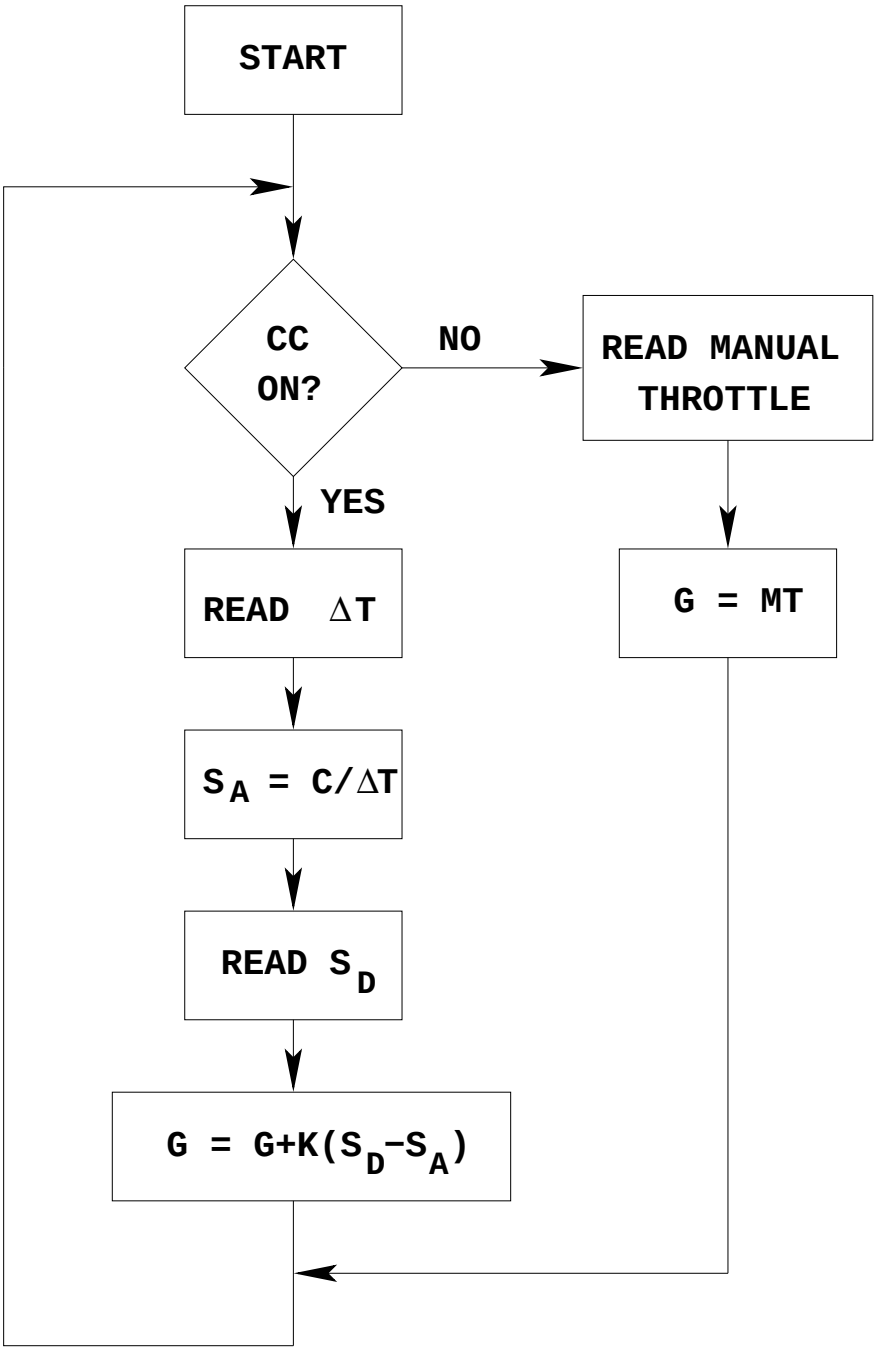
More detailed block diagram of cruise control system



ΔT = time for one revolution of wheel.

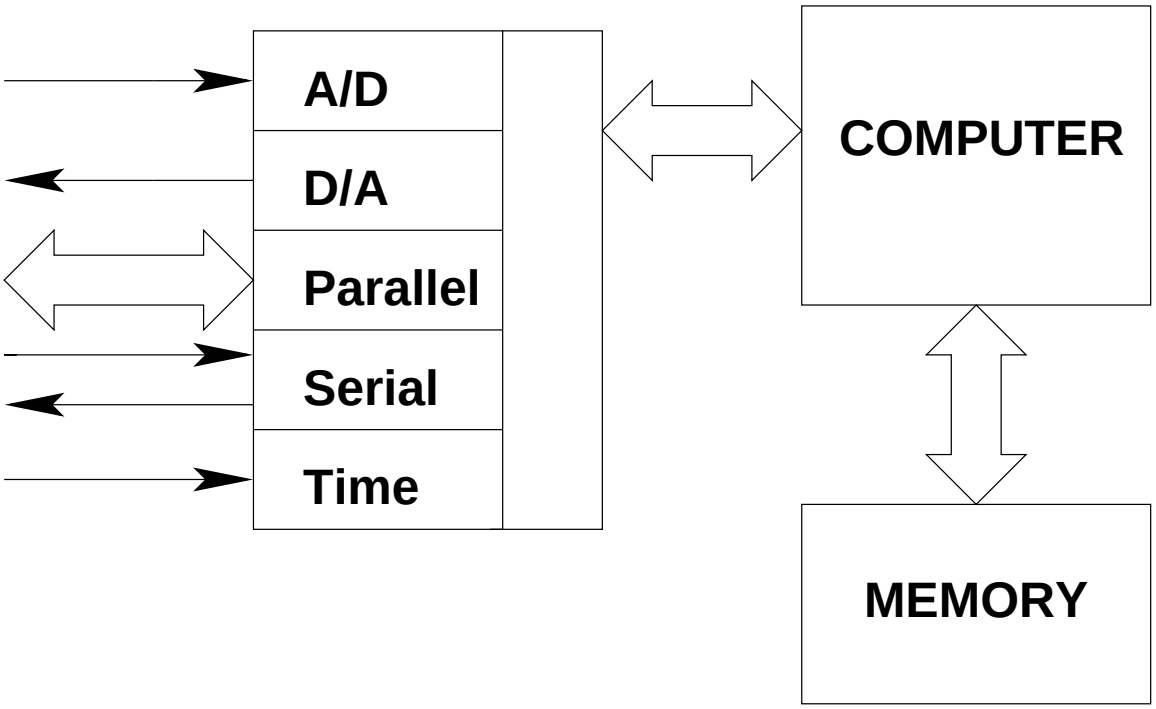
Speed = $C/\Delta T$, where C is the circumference of the wheel

Cruise control flow chart



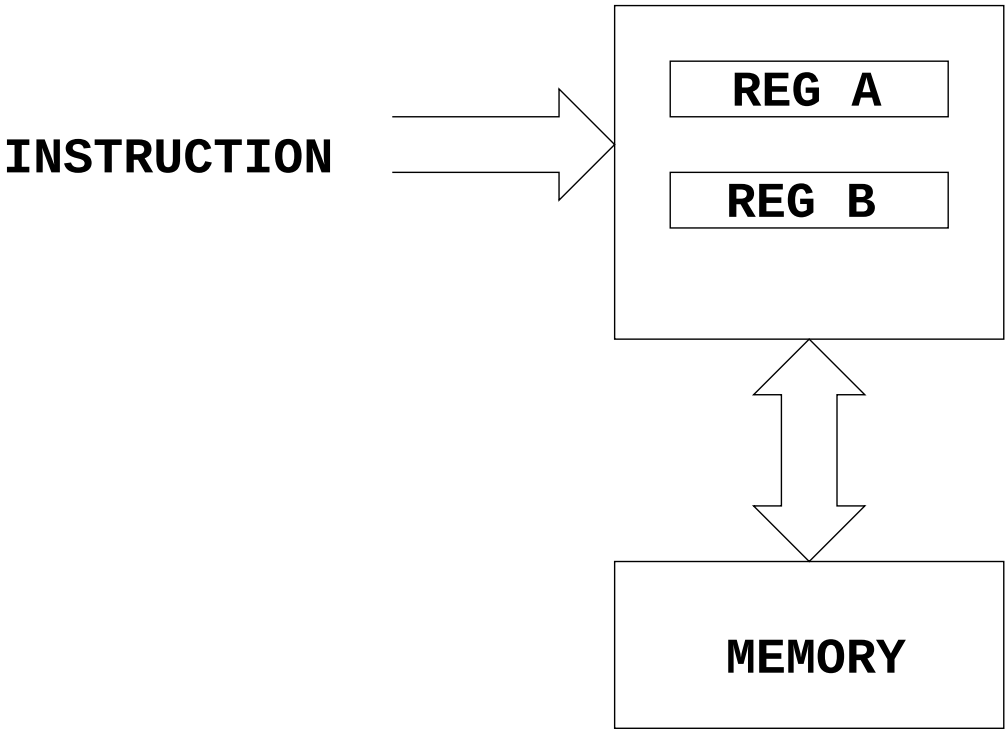
A microprocessor is just a state machine

MICROCONTROLLER



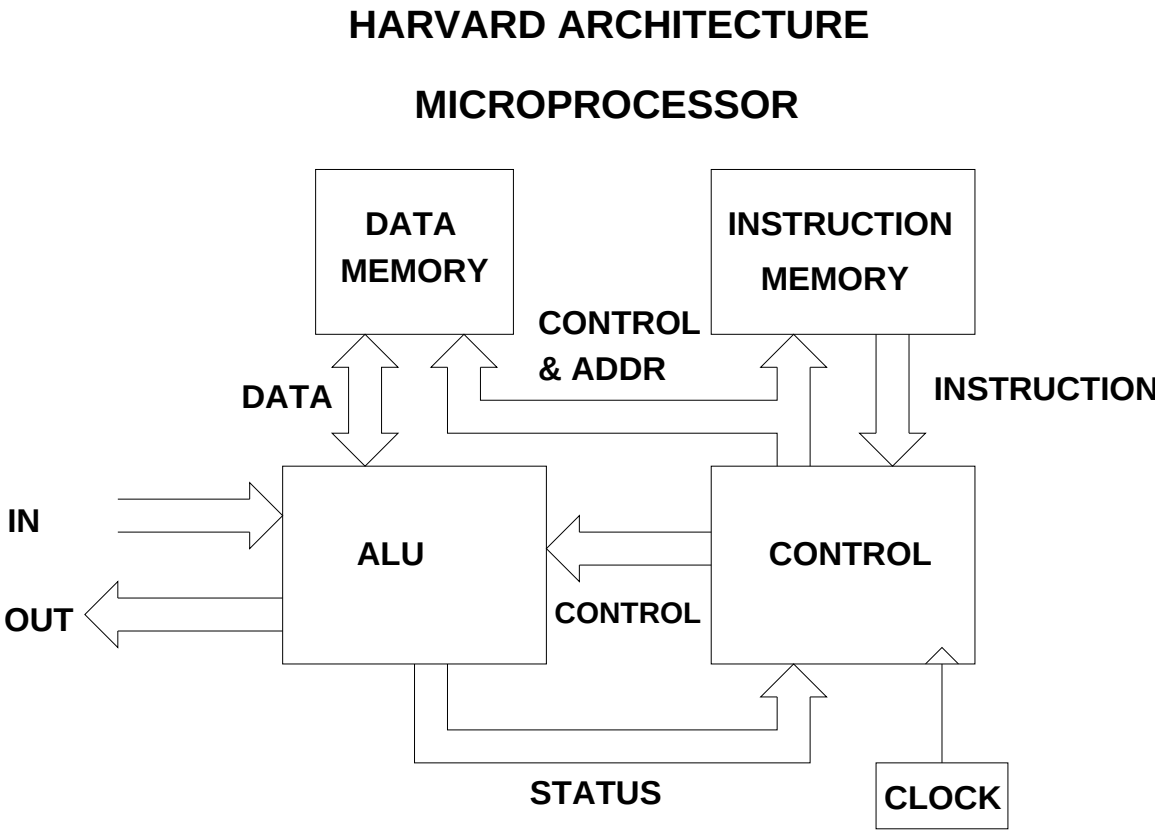
Simple microcontroller – a microprocessor with peripherals on a single chip

SIMPLE MICROPROCESSOR



INSTRUCTION	ACTION
18 06	(A) + (B) => A
87	0 => A
5A 05	(A) => Address 5

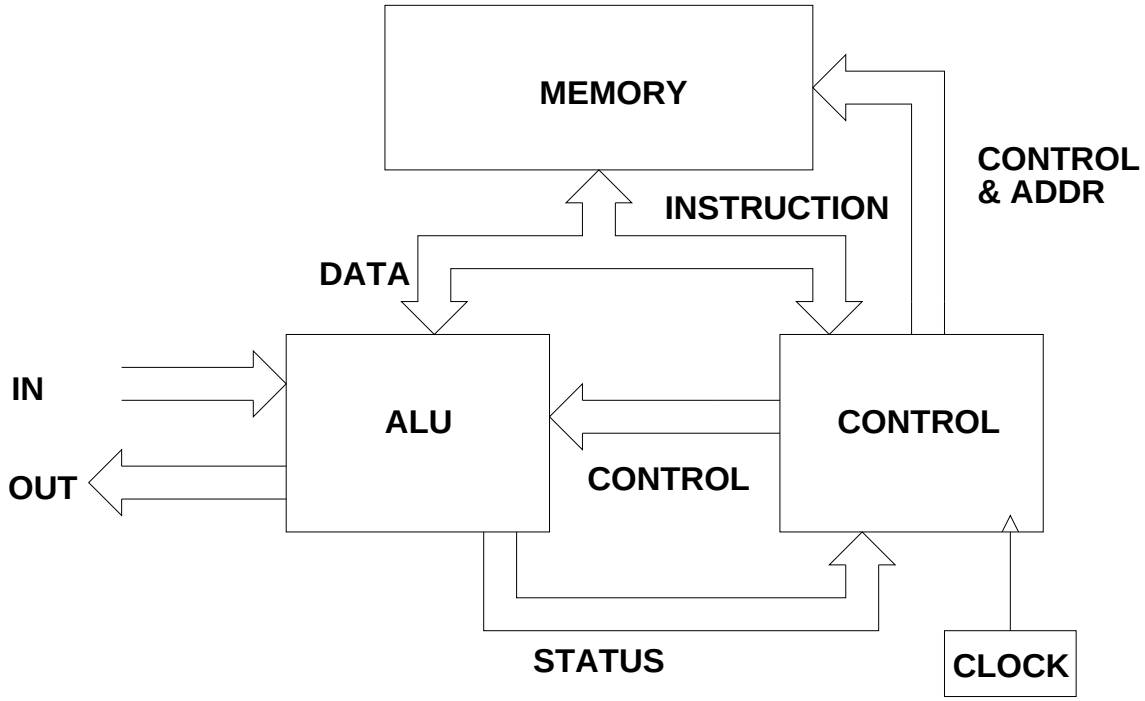
Harvard architecture microprocessor



Princeton architecture microprocessor

PRINCETON (VON NEUMAN) ARCHITECTURE

MICROPROCESSOR



Microprocessor memory map