

Pemrograman Perangkat Keras

Model Pemrograman dan Arsitektur Perangkat Keras



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Program Steps

Program Requirements

References

Right moves could improve the efficiency [1]

- ▶ Take the right steps
- ▶ Reduce the faults

Five-steps

1. Initialization steps
2. Input steps
3. Processing steps
4. Output steps
5. Terminations steps

Describe what need to do to reach a desire goal

- ▶ Five-steps programming are blueprint of project
- ▶ Describe the peripherals, flows, and debugging

Initialization is to establish the environment in which the program will run

Background preparation must be done before the program

- ▶ Data-sheet
- ▶ Calibrations
- ▶ Power supply

Input step is the sequence of program statements that are necessary to acquire the information needed to solve the task at hand

Data come from peripheral

- ▶ Sensor
- ▶ Potensio
- ▶ File handle
- ▶ Database
- ▶ etc

- ▶ Process step is responsible for taking a set of inputs and processing it to get a new set of data
 - Receive and response the data from input peripheral
- ▶ Program may have multiple Process step
 - A process step can take another process step to complete task

- ▶ Output step is responsible for using the result of the Process step
 - Typically output on some device or sent to some other peripheral
- ▶ Output step could be the input for other program
 - Dependency a program to another program

- ▶ Termination step is responsible to cleaning up after the program finished
- ▶ Termination step also responsible to handle the running program
 - Identify the failure peripheral
 - Stop the action cause of suddent failure

- ▶ Hardware programming need Integrate Development Environment (IDE)
 - Provide comprehensive facilities
 - Integrated with build, debug, and code features
- ▶ IDE that used to hardware programming
 - Eclipse IDE
 - Arduino IDE
 - Atmel studio
 - etc ...

```
#include <avr/io.h>

int main (void){
    // Where your initiation place
    // in this line, your code will be executed once

    while(1){
        // The code in this section will be executed forever
    }
    return 0;
}
```

Figure 1: Code Structure

- ▶ Every hardware programming at least need two structure
 - Setup or main : provide initiation
 - Loop or while(1) : code line that will execute forever
- ▶ Knowledge about the registers, peripheral, protocol of the MCU
 - Read the data-sheet of the MCU
 - Addressing the register
 - Different MCU (usually) has different structure

Atmega328

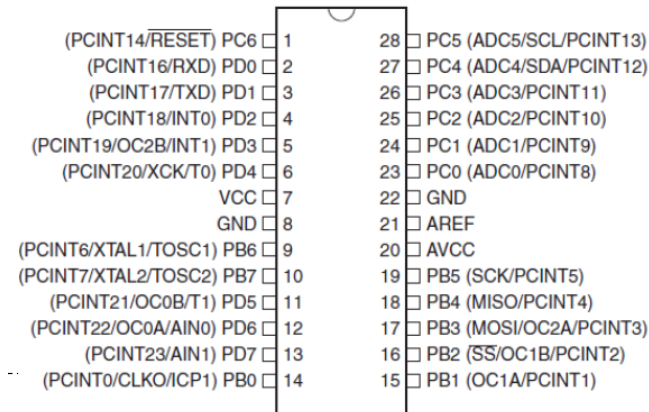


Figure 2: Data-sheet ATmega328

- [1] J. J. Purdum and B. Levy, *Beginning C for Arduino*. Springer, 2012.

Thank You!