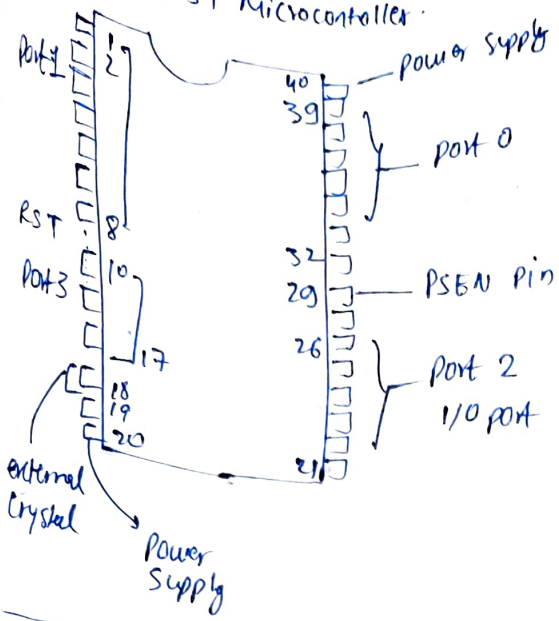
## Pin diq 8051 Microcontroller.




Pin 1-8 (Iconown as Port 1)
- It is internally pulled up, bi-direction i/o port
- doesn't serve any other fun.

Pin 9 - Reset Pin

Pin 10-17 - Port 3
- control signal
- interrupts.

Pin 18-19 - used for interfacing for external crystal to get sys clock.

Pin 20 - Power supply

Pin 21-26 Port 2 I/O.

Pin 29 → PSEN pin
→ used for program store Enable.

Pin 32-39 Port 0 I/O

Pin 30 - External access input
Pin 31 - demultiplexer.
Pin 40 - power supply.

## Life Cycle of Embedded sys:

Phase-1 Product Specification

Phase-2 HW-SW Partition

Phase-3 Iteration & implementation

Phase-4 Detailed HW/SW design (SW design, HW design)

Phase-5 HW/SW integration

Phase-6 Acceptance testing

Phase-7 Maintainence Upgrade

Product release

PHIDHAM

P - Product spec
H - HW/SW Partition
I - Iteration & Implementation
D - Design HW SW
H - HW/SW interface
A - Accept
M - maintain

| Microprocessor | Microcontroller |
|---|---|
| - heart of computer sys. | - heart of an embedded sys. |
| - You can't use in compact sys. | - You can use in Compact sys. |
| - cost of entire sys. is high and complex | - cost of entire sys. is low and simple. |
| - Power consumption is high | - Power consumption is low. |
| - do not have power saving feature | - offer power saving feature |
| - based on Von-neumann model | - based on harvard architecture. |

## Computer System

- needs human interaction to perform task
- It has 2 parts → Hardware → software
- Performs many task
- user has to pay more for a sys.
- need more opr^n power
- Computer sys. are difficult to use as compare to embedded
- needs more memory to store data

## Embedded System

- does not need human interaction
- 3 part → hardware → software → firmware
- performs limited task
- lesser cost for embedded sys
- need lesser power
- easy to use as compare to computer sys.
- need less memory

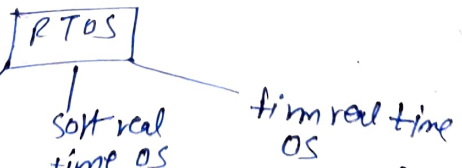
## RTOS

→ used in environment where a large no. of events, mostly external to computer sys. must be accepted and processed in a short time or within certain deadline.

→ Processing time is measured in tenth of seconds.

→ Syst is time-bound and has a fixed deadline.

→ Three types




hard real time OS (guarantees critical task completed within a range of time)

soft real time OS (Some relaxation in time)

firm real time OS (Small impact, missing a deadline can have unintended consequences, including reduction quality of product).

→ Maximum consumption of devices and system. Thus more output from all computer.

→ Error free.

→ Memory allocation is best managed

→ RTOS can also be embedded sys because size of code is small.

Appln of embedded sys.

1- Central heating system.

→ convert chemical energy into thermal energy

→ delivered to numerous spaces within a building

→ thermostat control is compulsory to adjust temp. which is achieved by embedded sys.

→ used in
- office building
- factory
- Grocery store.

2- GPS syst

→ navigation sys. that uses satellite and recieves to synch. data related to loc$^n$, time, velocity.

→ embedded GPS device allow people to find their location & dest$^n$

→ cars
Mobile device
Palm top.

2- ATM (Automatic teller machine)

→ computerized machine used in banking the comm$^n$ with bank computer over network

→ embedded sys in ATM display the transaction data & process input from ATM keyboard

→ withdraw cash
→ check account bal$^e$
→ deposit money.

3. fitness tracker

→ wearable device monitor health & track activity.

→ embedded sys. garner the data related to activity like heart rate, body temp. & no. of footstep.

- Medical monitoring
- Sport training

(5) Medical device

- help treat patient who need frequent monitoring & constant attention.

→ embedded sys. sensor to gather data related to patient health like pulse rate, readings from implants,

→ diagnosing
- Ultrasound Scanners.