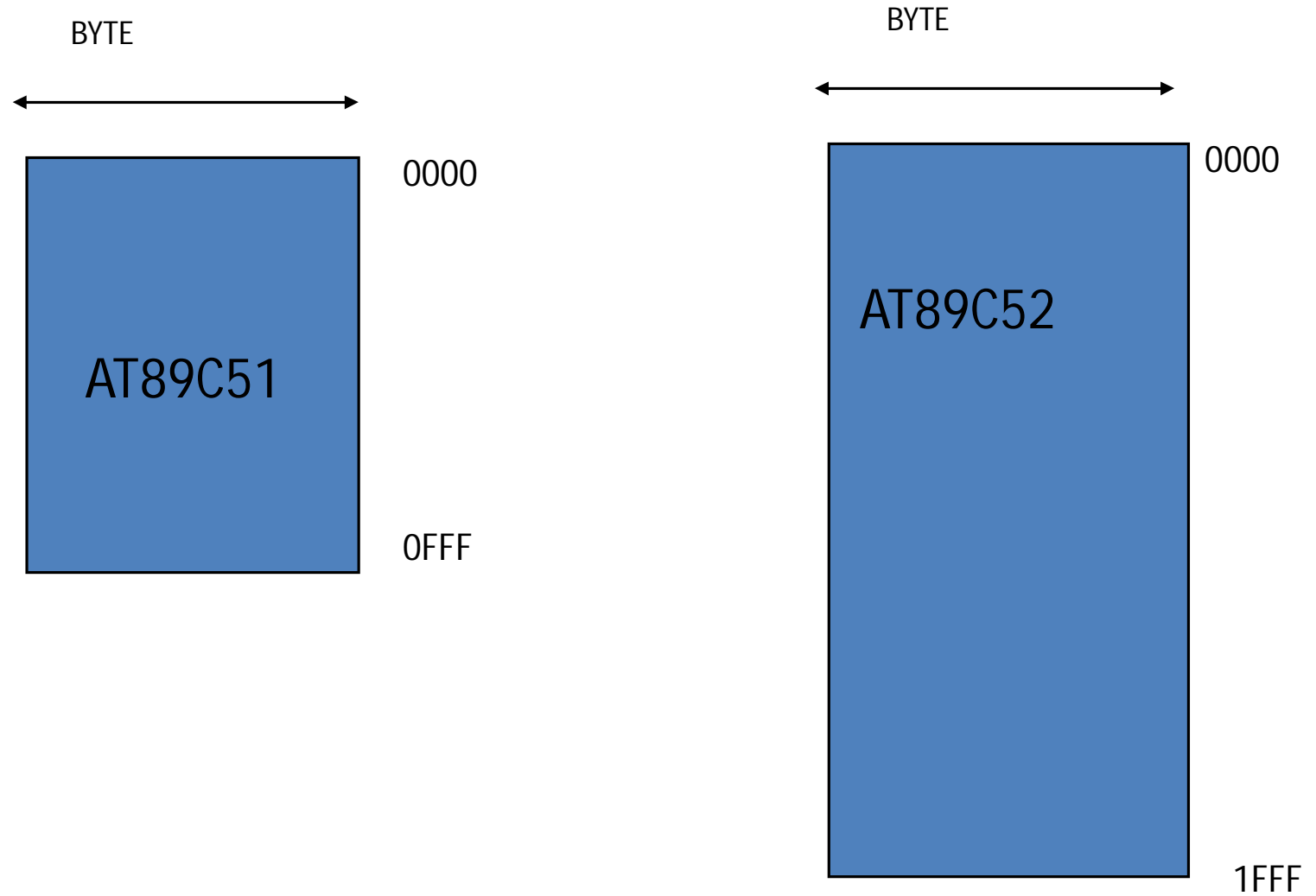


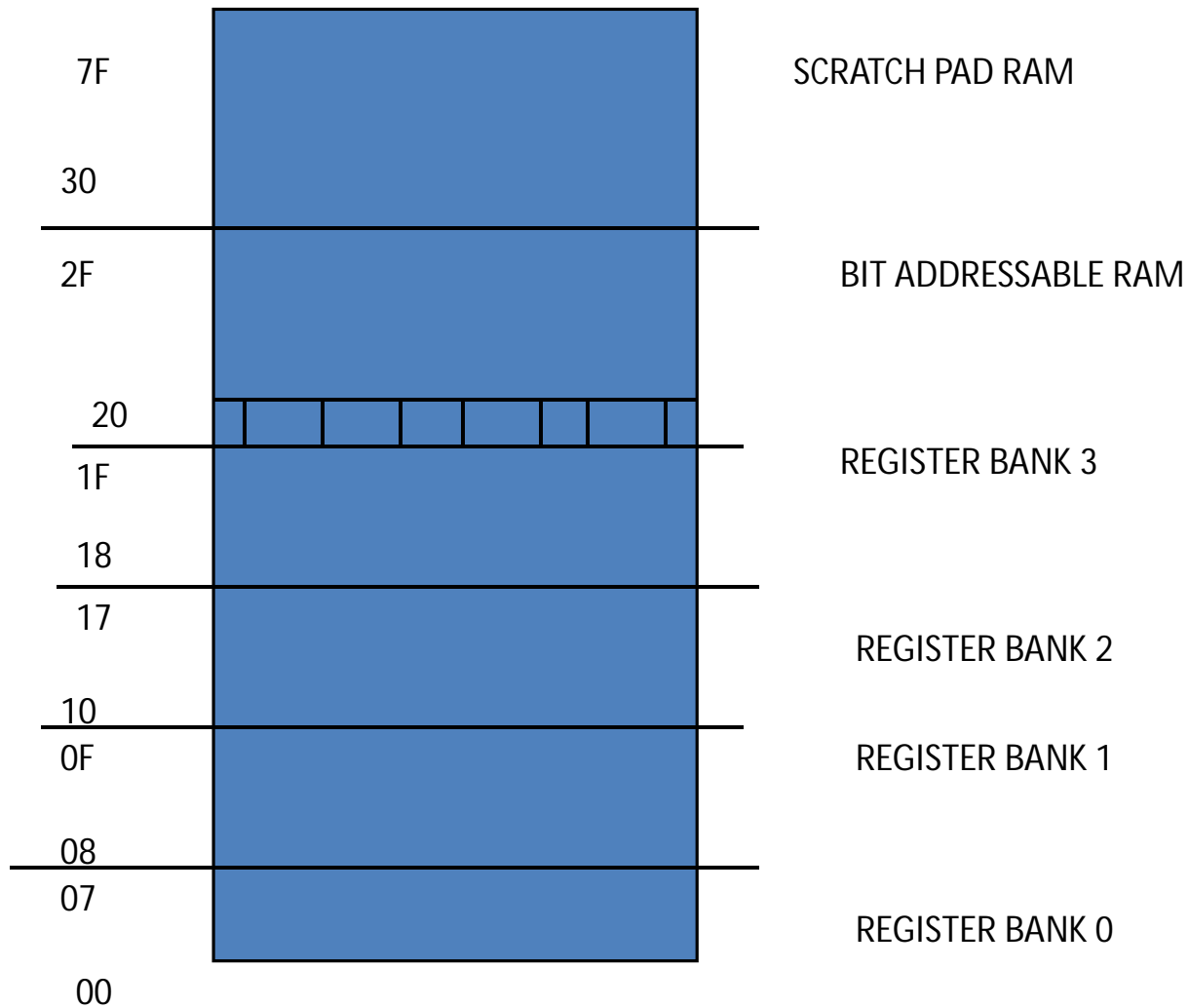
Microcontroller and Embedded Systems

8051 MICROCONTROLLER ON CHIP ROM

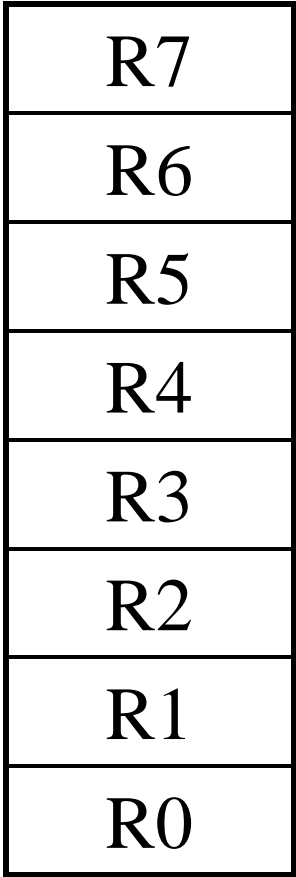


ON CHIP ROM ADDRESS RANGE

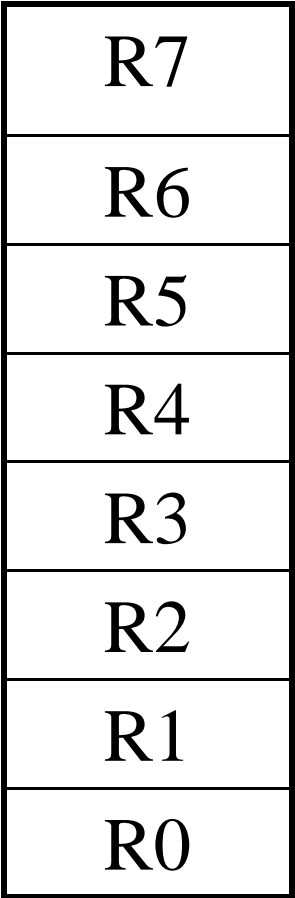
RAM ALLOCATION IN 8051



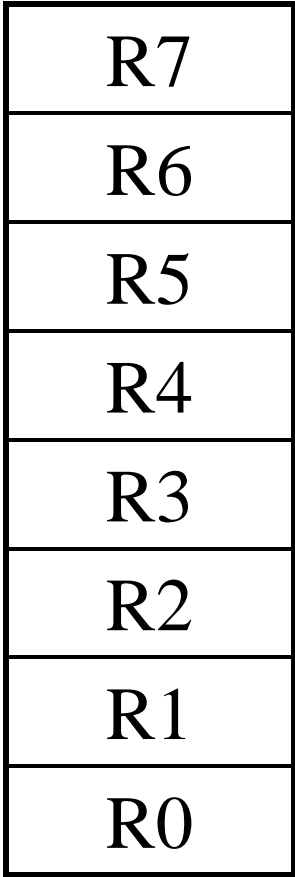
REGISTER BANKS



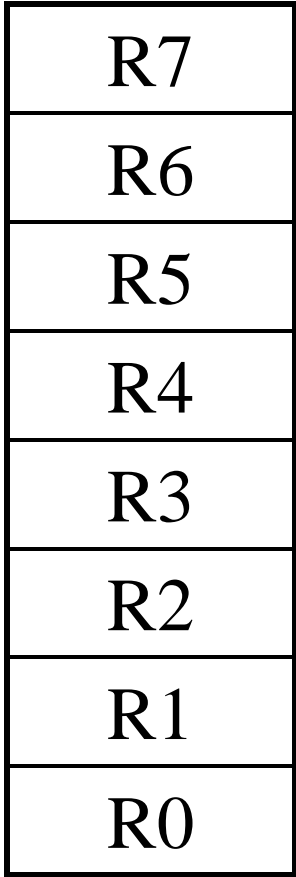
BANK 0



BANK 1

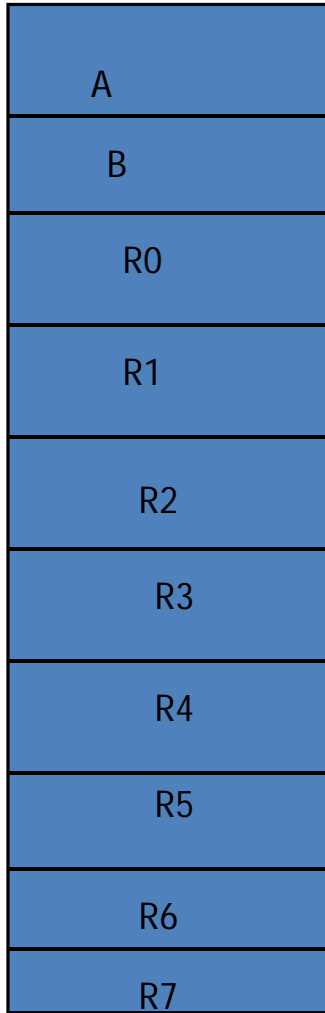


BANK 2

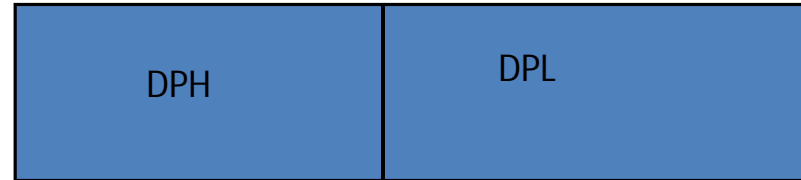


BANK 3

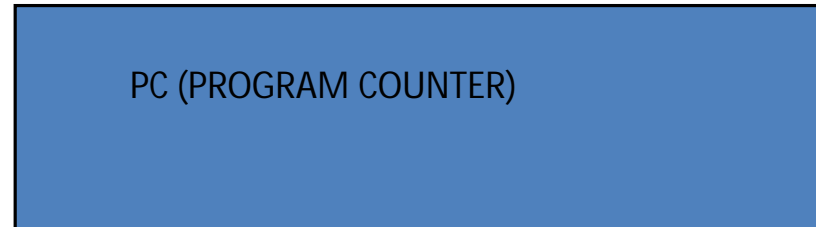
REGISTERS OF 8051



8-BIT REGISTERS



DPTR



16-BIT REGISTERS

On-Chip Memory.

**IRAM
Addr**

00

R0 R1 R2 R3 R4 R5 R6 R7

Description

Reg. Bank 0

08

R0 R1 R2 R3 R4 R5 R6 R7

Reg. Bank 1

10

R0 R1 R2 R3 R4 R5 R6 R7

Reg. Bank 2

18

R0 R1 R2 R3 R4 R5 R6 R7

Reg. Bank 3

20

00 08 10 18 20 28 30 38

Bits 00-3F

28

40 48 50 58 60 68 70 78

Bits 40-7F

30

General User RAM
& Stack Space
(80 bytes, 30h-7Fh)

General
IRAM

7F

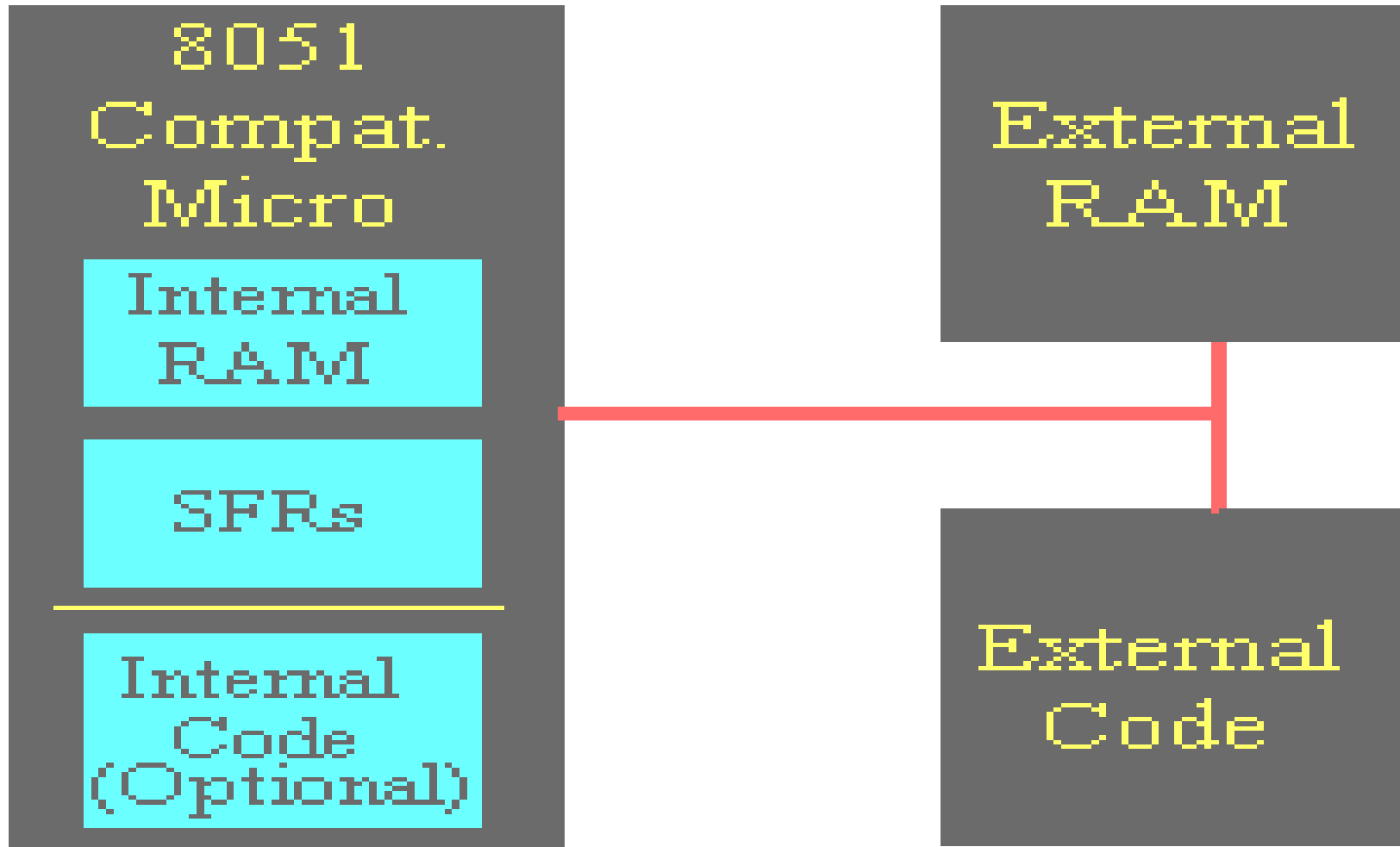
80

Special Function
Registers (SFRs)
(80h - FFh)

SFRs

⋮
⋮
⋮

8051: Types of memory



8051: Types of memory

- **On-Chip Memory** refers to any memory (Code, RAM, or other) that physically exists on the microcontroller itself. On-chip memory can be of several types, but we'll get into that shortly.
- **External Code Memory is code (or program)** memory that resides off-chip. This is often in the form of an external EPROM.
- **External RAM is RAM memory that** resides off-chip. This is often in the form of standard static RAM or flash RAM.

CODE MEMORY

- Code memory is the memory that holds the actual 8051 program that is to be run.
- This memory is limited to 64K.
- It may be found *on-chip*, either burned into the microcontroller as ROM or EPROM. Code may also be stored completely *off-chip* in an external ROM or, more commonly, an external EPROM.
- it is possible to have 4K of code memory *on-chip* and 64k of code memory *off-chip* in an EPROM.

External RAM

- It is off-chip, it is not as flexible in terms of accessing, and is also slower as compared to internal RAM.
- While Internal RAM is limited to 128 bytes the 8051 supports External RAM up to 64K.