SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

Coimbatore-35

DEPARTMENT OF BIOMEDICAL ENGINEERING

19BMB303 & Fundamentals of Microprocessors and Microcontrollers

Unit V - 32- BIT ARM PROCESSOR

III Year/ VI Sem

Dr. K. Manoharan,
ASP / BME / SNSCT

MICROCONTROLLER BASED SYSTEM DESIGN

Reduced Instruction Set Computer

Design Physiology

RISC Vs CISC Architecture

ARM Processor Architecture

ARM Core data flow model, Barrel Shifter

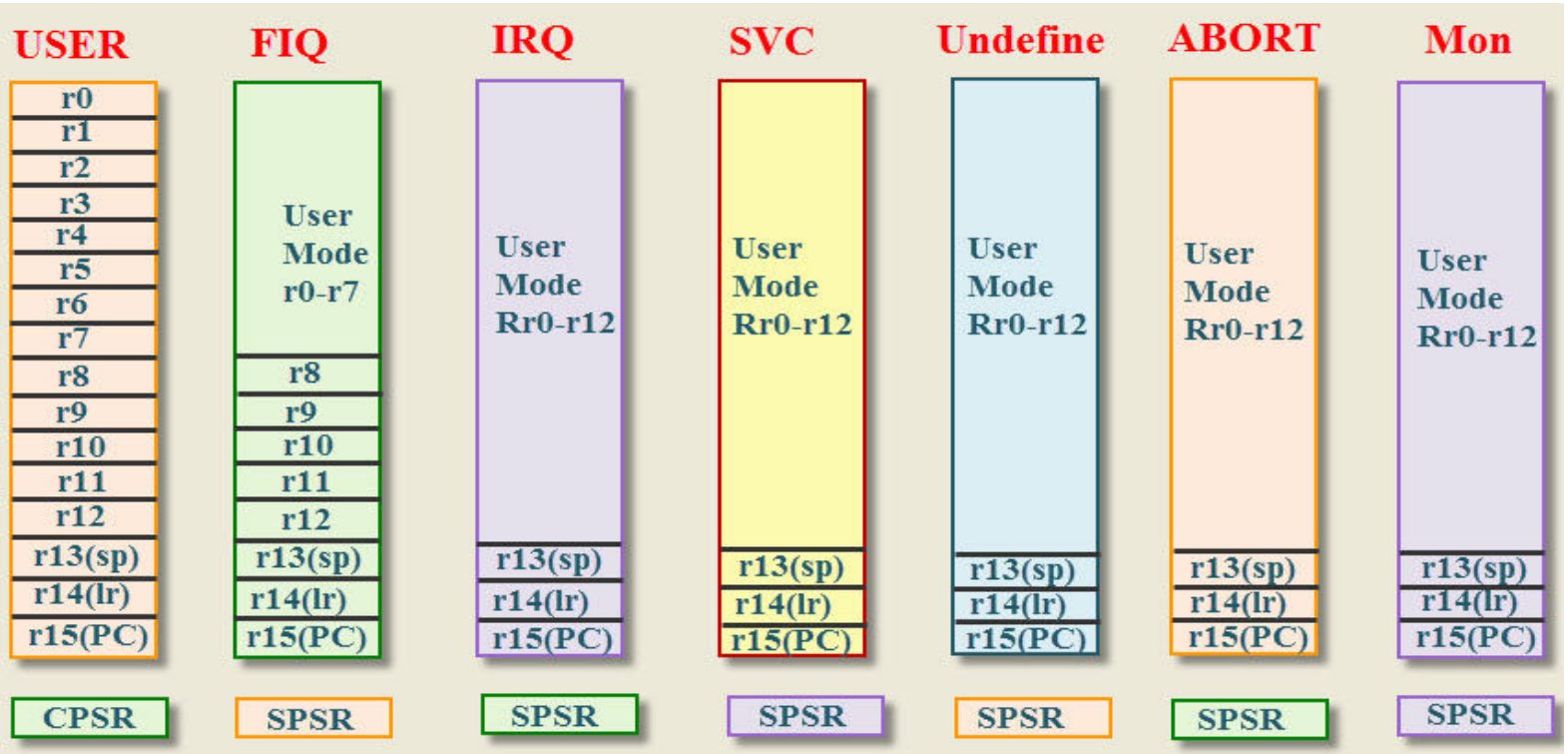
ARM processor modes and families

Pipelining

ARM instruction Set and its Programming

Pulse oximeter using ARM processor

ARM processor modes and families



ARM processor modes and families

ARM7 supports **7 processor modes**, including:

- **User** – Normal program execution
- **FIQ** – Fast interrupt
- **IRQ** – Standard interrupt
- **Supervisor** – OS mode
- **Abort** – For memory access violations
- **Undefined** – For undefined instructions
- **System** – Privileged user mode (used by OS)

ARM processor modes and families

Family	Highlights	Examples
ARM7	First popular ARM core. Simple, low power, supports ARMv4T.	ARM7TDMI
ARM9	Faster than ARM7, separate instruction and data caches.	ARM926EJ-S
ARM11	First to support SIMD (media instructions), better branch prediction.	ARM1176JZ-S (used in early Raspberry Pi)
Cortex-M	For microcontrollers (embedded systems). Optimized for real-time, low-power tasks.	Cortex-M0, M3, M4, M7, M33
Cortex-R	Real-time processors for safety-critical systems (automotive, medical).	Cortex-R4, R5, R7
Cortex-A	High-performance apps processors (for smartphones, tablets).	Cortex-A5, A7, A53, A72, A76
Neoverse	For cloud and server applications.	Neoverse N1, V1
ARMv8	Introduced 64-bit support (AArch64) while still supporting 32-bit (AArch32).	Cortex-A53, A57, A72, A76
ARMv9	Latest generation: better security (Confidential Compute Architecture), AI, and performance.	Cortex-X2, Cortex-A710