SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

ARM-History & Architecture

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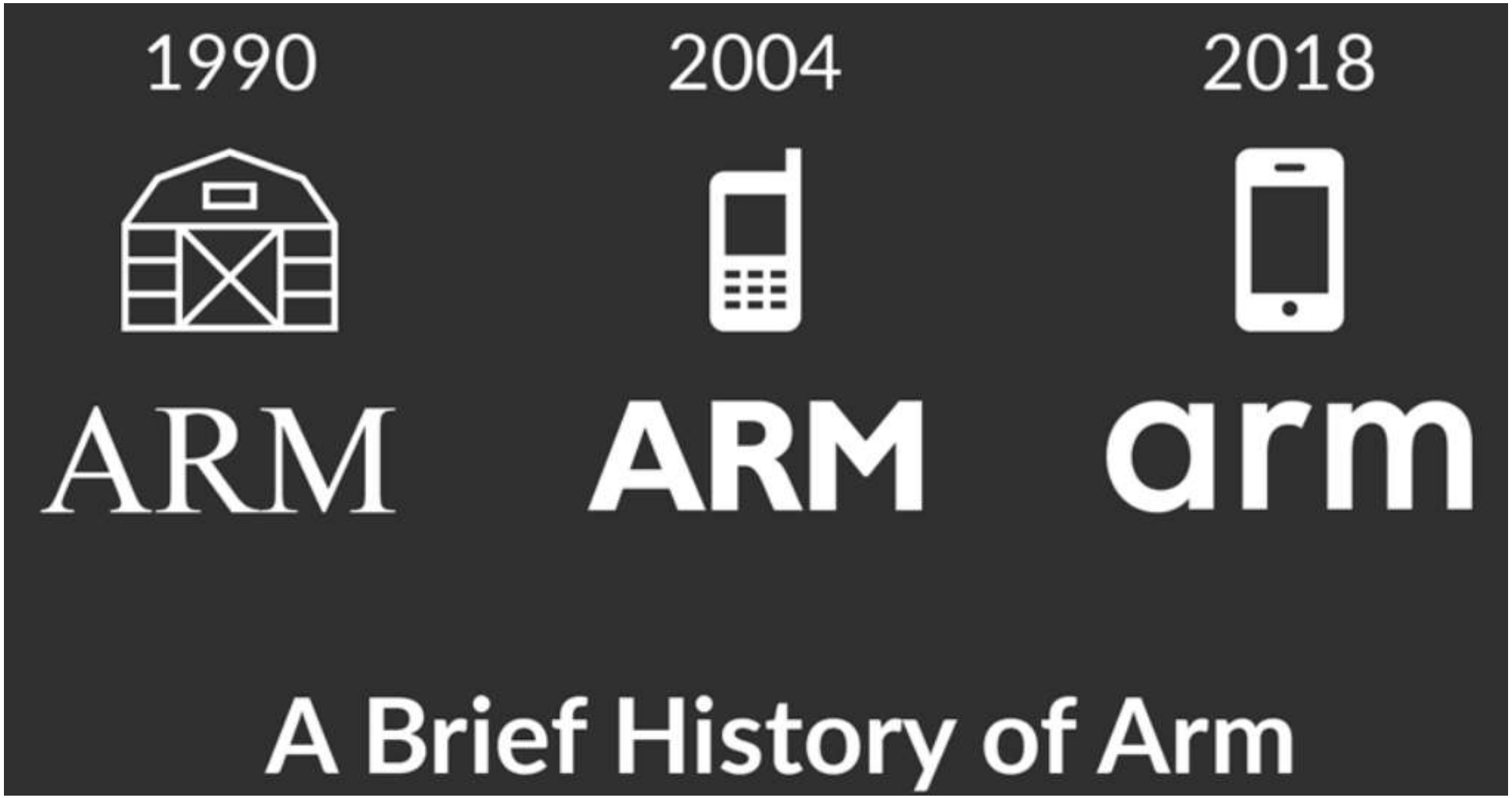
ARE YOU USING THIS?


1990
2004
2018
ARM
ARM
arm
A Brief History of Arm

Introduction to ARM

- ARM, which stands for Advanced RISC Machines
- Has a significant history in the development of microprocessors.
- Especially in the mobile and embedded systems markets.

History of ARM

1980s:

- Foundation: ARM was founded in 1990 as a joint venture between Acorn Computers, Apple, and VLSI Technology.

- Acorn RISC Machine: The ARM architecture originated from Acorn Computers' research project to create a new processor for their Archimedes personal computer. The project resulted in the ARM1 processor, which was a 32-bit RISC (Reduced Instruction Set Computing) design.

History of ARM

1990s:

- Expansion: ARM gained popularity due to its power efficiency and performance. Companies like Apple, DEC, and Texas Instruments started using ARM processors in their products.

- ARM6 and ARM7: These iterations brought improvements in performance and efficiency, leading to widespread adoption in various devices beyond computers.

History of ARM

2000s:

- **Smartphones and Mobile Devices:** ARM processors became dominant in the mobile device market. The ARM architecture’s energy efficiency suited the needs of portable devices well.
- **ARM Cortex-A Series:** Introduced in 2005, this series aimed at higher performance and expanded the ARM architecture's reach into higher-end applications, including smartphones.
- **Cortex-M and Cortex-R Series:** These were introduced for microcontroller and real-time embedded applications, respectively, widening ARM's presence in various sectors.

History of ARM

2010s:

- **Growth and Diversification:** ARM's influence continued to grow across various industries, including automotive, IoT (Internet of Things), and servers.
- **ARMv8-A Architecture:** This introduced support for 64-bit computing, expanding ARM's capabilities into the high-performance computing market.
- **Acquisition by SoftBank:** In 2016, SoftBank acquired ARM Holdings, sparking discussions about the potential impact on ARM's open licensing model and future developments.
- **Partnerships and Licensing:** ARM expanded its partnerships, allowing other companies to license and customize its designs, leading to a wide array of ARM-based processors tailored for specific applications.

History of ARM

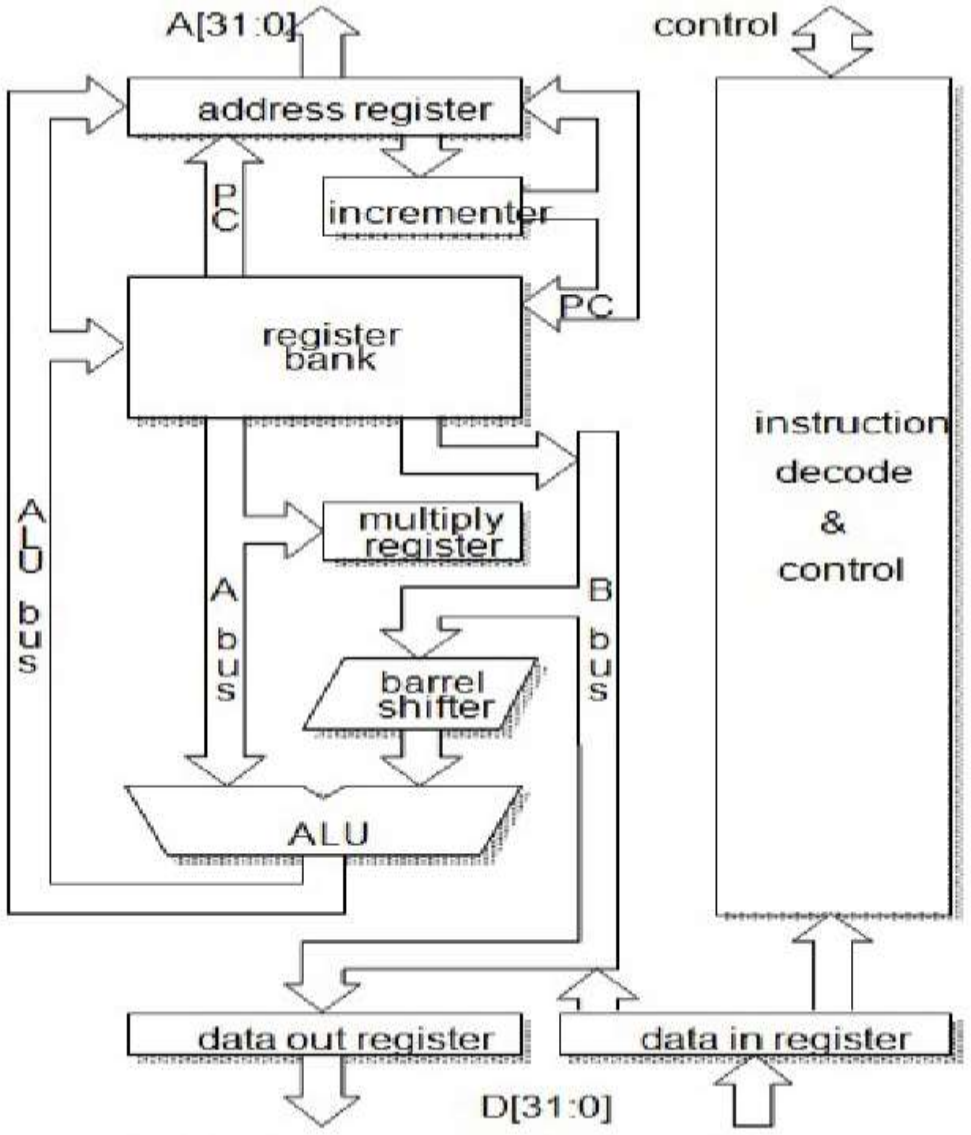
2020s till 2023:

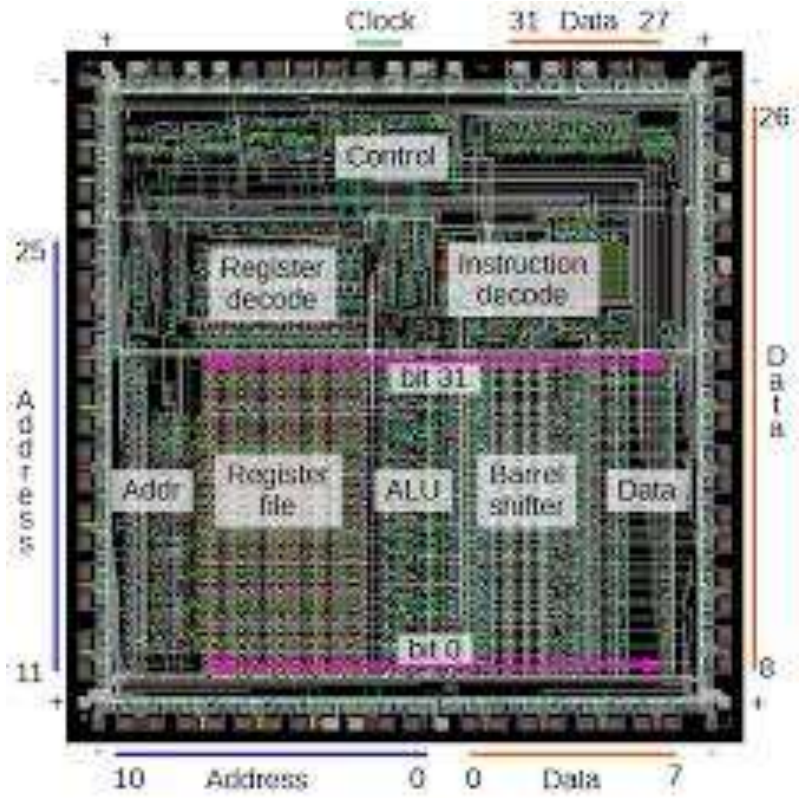
- **Continued Evolution:** ARM maintained its position as a dominant force in mobile and embedded processors while making strides in other domains, such as edge computing, AI, and automotive technology.

Features of ARM

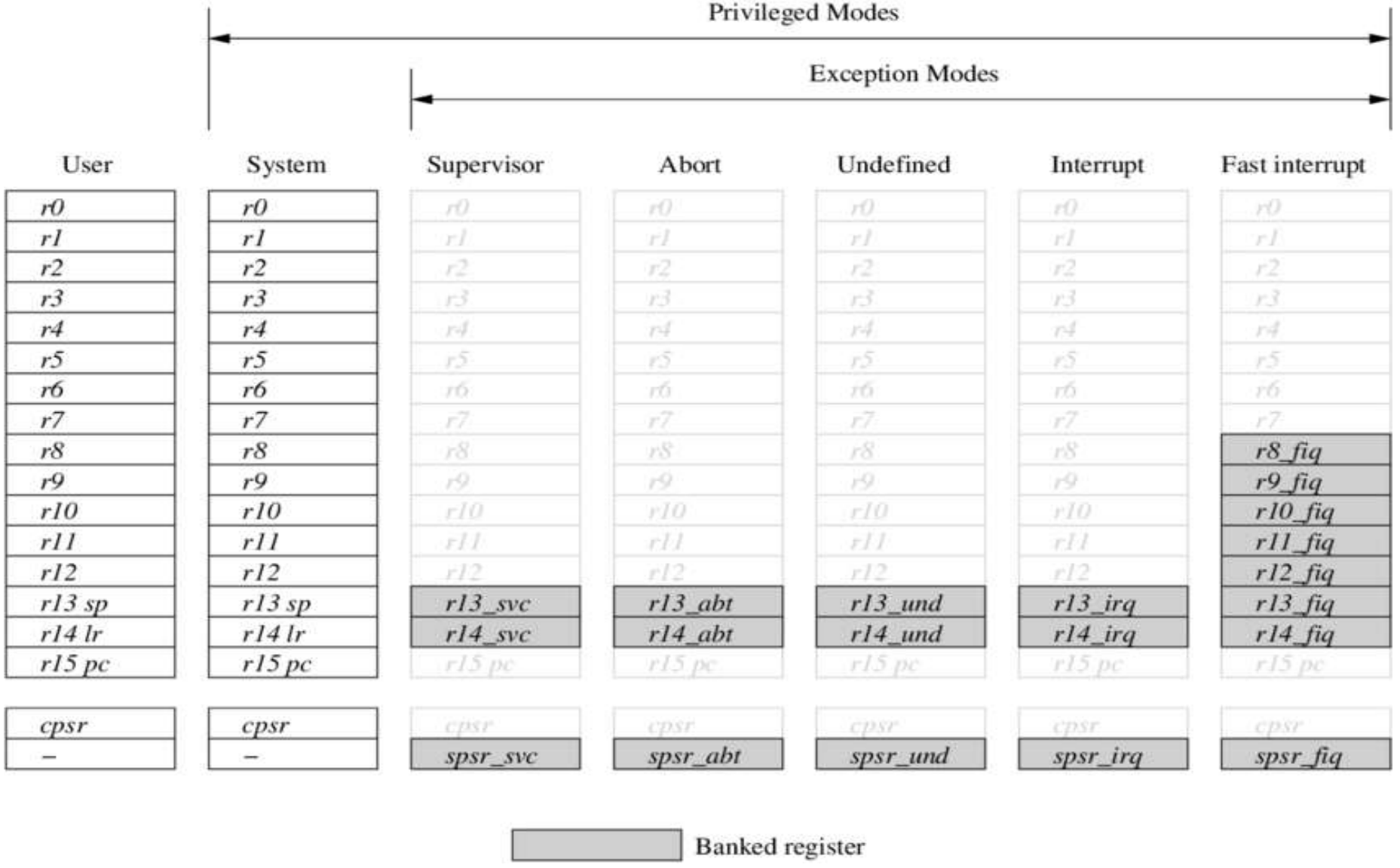
- Load/store architecture
- Single-cycle execution
- Energy efficiency
- Scalability
- Customization and Licensing
- Multicore Support
- Architecture Variants
- Support for 32-bit and 64-bit Computing
- Adaptability to Various Operating Systems
- Reliability and Security

ARM ARCHITECTURE





REGISTERS


Privileged Modes
Exception Modes
User
System
Supervisor
Abort
Undefined
Interrupt
Fast interrupt
r0
r1
r2
r3
r4
r5
r6
r7
r8
r9
r10
r11
r12
r13 sp
r14 lr
r15 pc
cpsr
–
r13_svc
r14_svc
spsr_svc
r13_abt
r14_abt
spsr_abt
r13_und
r14_und
spsr_und
r13_irq
r14_irq
spsr_irq
r8_fiq
r9_fiq
r10_fiq
r11_fiq
r12_fiq
r13_fiq
r14_fiq
spsr_fiq
Banked register

ADVANTAGES OF ARM

- Low Power Consumption
- Better Battery life
- Work Faster – ARM performs single operation at a time
- Lower latency that is quicker response time.
- Multiprocessing feature

ASSESSMENT

1) What is the function of Barrel Shifter?

2)What is a RISC machine?


Thank
you