Real Time OS

WHAT DOES AN OPERATING SYSTEM

SUPERVISE RESOURCES & FUNCTIONS

- **MEMORY MANAGEMENT**
- **INPUT-OUTPUT MANAGEMENT**
- **CREATES & MANAGES FILES**
- **PROGRAM EXECUTION CONTROL**
- **PROVIDES A USER INTERFACE**

WHAT IS A REAL TIME OPERATING SYSTEM (RTOS)

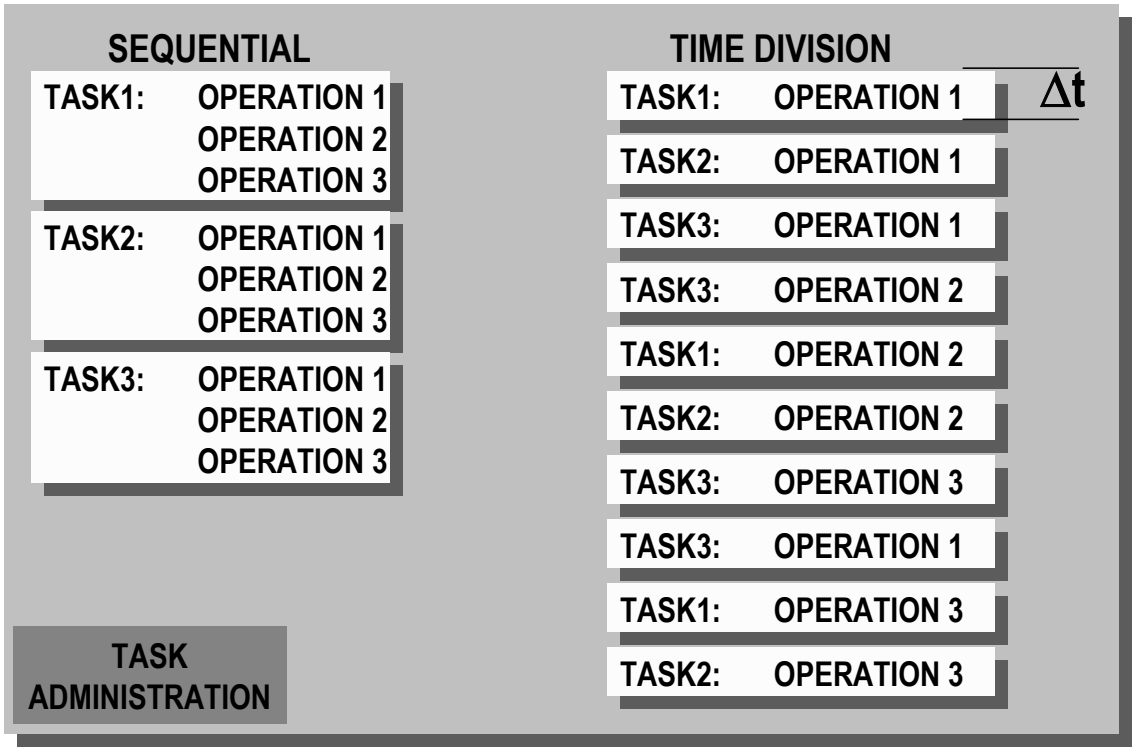
IN A SYSTEM WITH CRITICAL TIME CONSTRAINTS

- **TIME DEPENDENT PROCESSES**
- ***SIMULTANEOUS* PROCESS EXECUTION**
- **COMUNICATION BETWEEN PROCESSES**
- **DYNAMIC RESOURCE ALLOCATION**
- **DYNAMIC PRIORITY ALLOCATION**

THE O.S. HAS TO ASSIGN RESOURCES AT EVERY INSTANT OF TIME ACCORDING TO DIFFERENT PROCESS STATUS

REAL TIME OPERATING SYSTEM (RTOS) BASIC CHARACTERISTICS

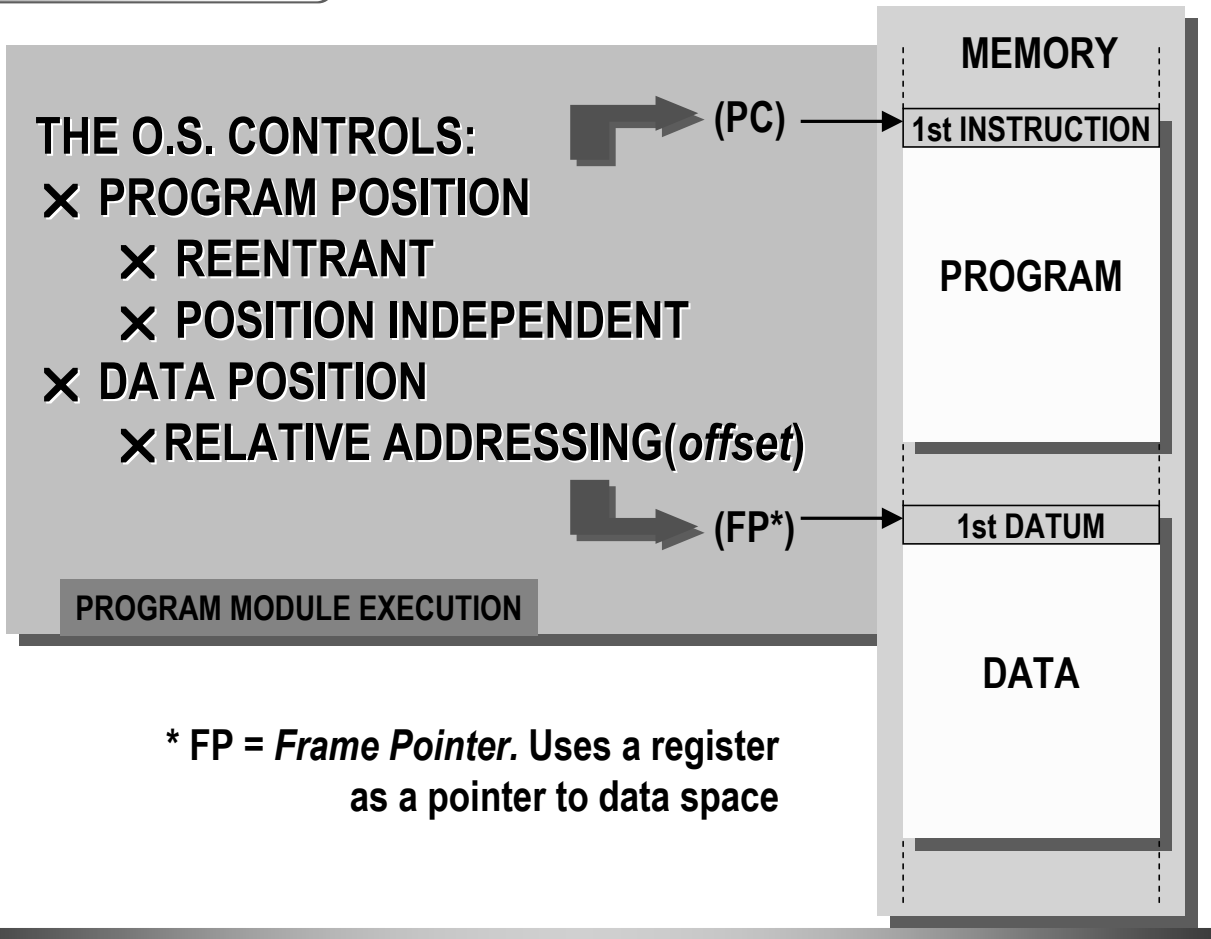
- MULTITASK (Time Sharing)
- MODULAR
- TOTAL SYSTEM CONTROL
  - MEMORY CONTROL
  - INTERRUPT CONTROL
  - PERIFERALS CONTROL (*Drivers*)


SEQUENTIAL
TASK1: OPERATION 1
OPERATION 2
OPERATION 3
TASK2: OPERATION 1
OPERATION 2
OPERATION 3
TASK3: OPERATION 1
OPERATION 2
OPERATION 3
TIME DIVISION
TASK1: OPERATION 1
TASK2: OPERATION 1
TASK3: OPERATION 1
TASK3: OPERATION 2
TASK1: OPERATION 2
TASK2: OPERATION 2
TASK3: OPERATION 3
TASK3: OPERATION 1
TASK1: OPERATION 3
TASK2: OPERATION 3
Δt
TASK ADMINISTRATION

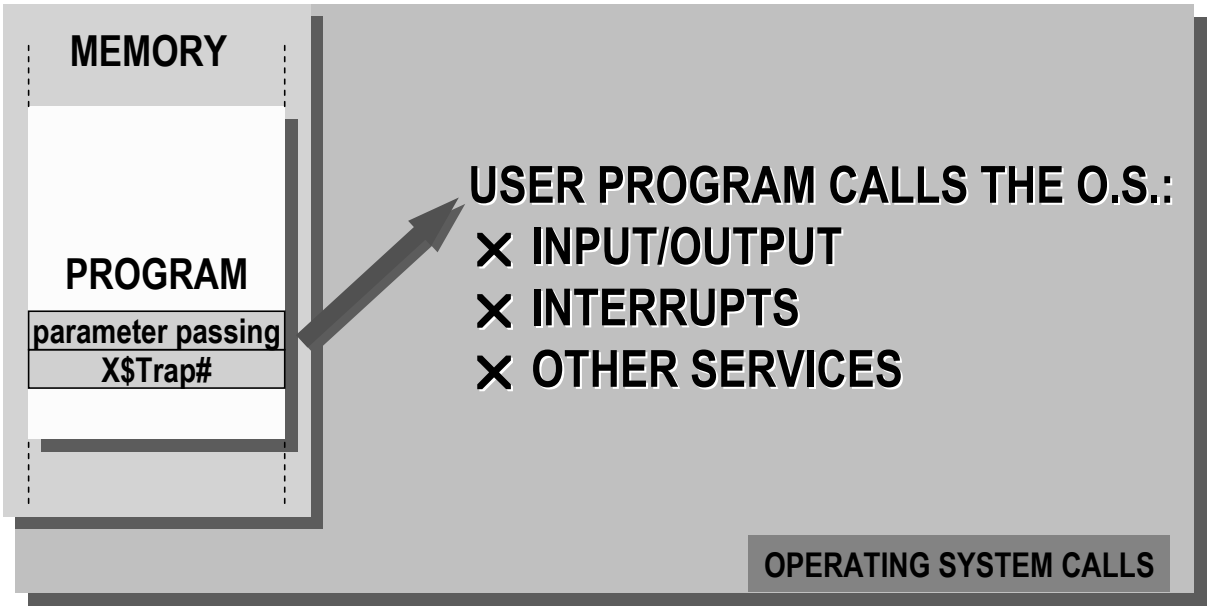
THE O.S. CONTROLS:

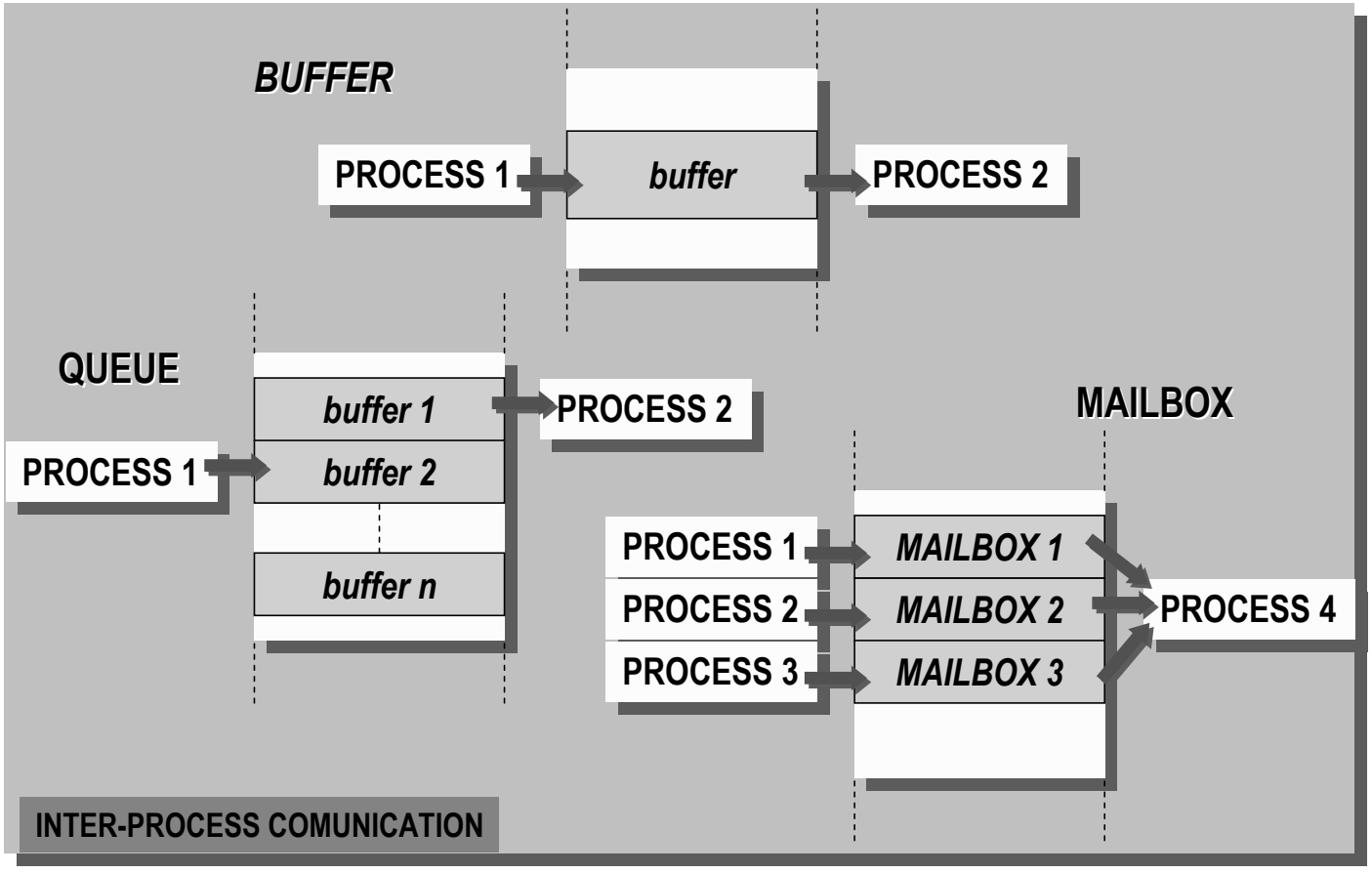
- PROGRAM POSITION
  - REENTRANT
  - POSITION INDEPENDENT
- DATA POSITION
  - RELATIVE ADDRESSING(*offset*)

PROGRAM MODULE EXECUTION



* FP = *Frame Pointer.* Uses a register as a pointer to data space


MEMORY
PROGRAM
parameter passing
X$Trap#
USER PROGRAM CALLS THE O.S.:
× INPUT/OUTPUT
× INTERRUPTS
× OTHER SERVICES
OPERATING SYSTEM CALLS


BUFFER
PROCESS 1
buffer
PROCESS 2
QUEUE
buffer 1
buffer 2
buffer n
PROCESS 1
PROCESS 2
MAILBOX
PROCESS 1
PROCESS 2
PROCESS 3
MAILBOX 1
MAILBOX 2
MAILBOX 3
PROCESS 4
INTER-PROCESS COMUNICATION