Lecture5

STACK MEMORY

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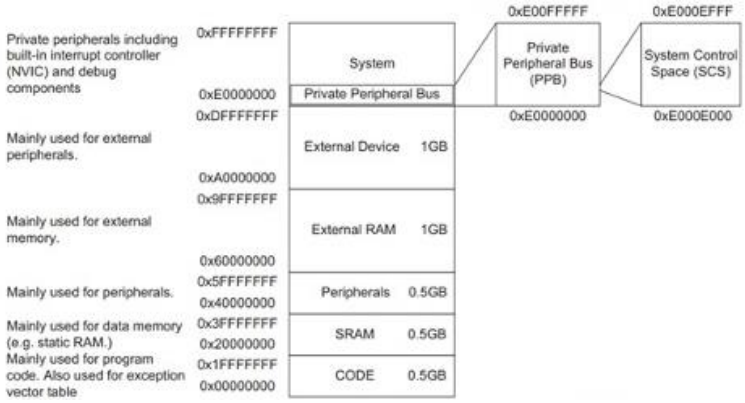
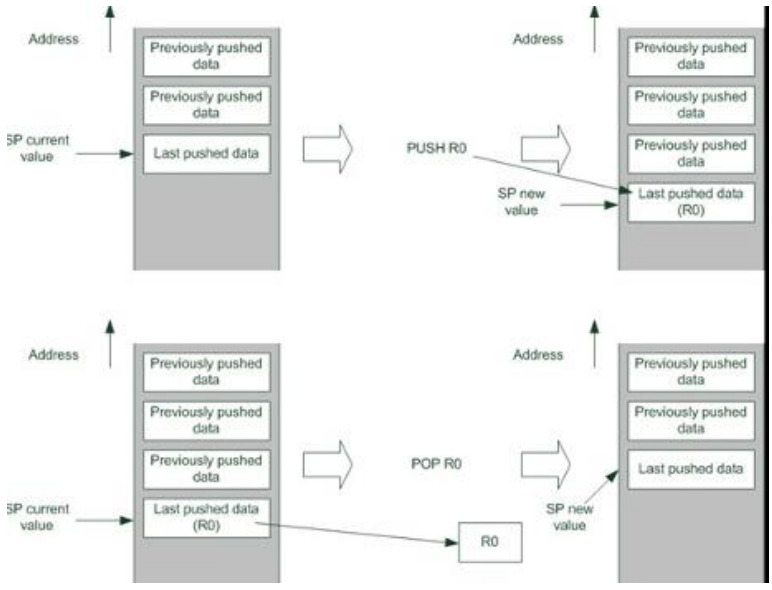
Memory Map:

- Cortex M processor contain 4Gbytes of address space is portioned into 4 groups:
  - Program code (Code Region)
  - Data access (SRAM Region)
  - Peripherals (Peripheral region)
  - Processor internal control and debug components

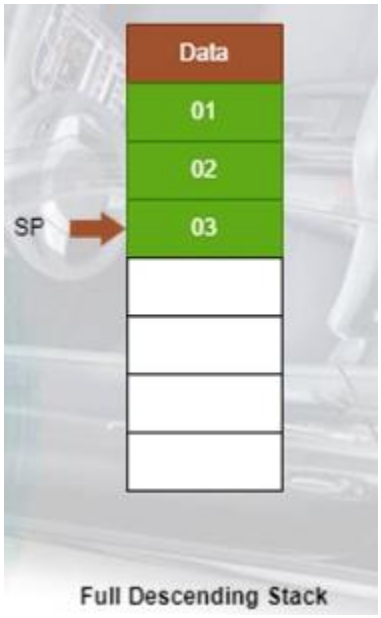


Stack Memory:

- Stack is kind of Memory use mechanism LIFO data storage buffer.
- ARM processors use main system memory for stack memory operations and push instructions to store data in stack and pop instruction to retrieve data from stack.

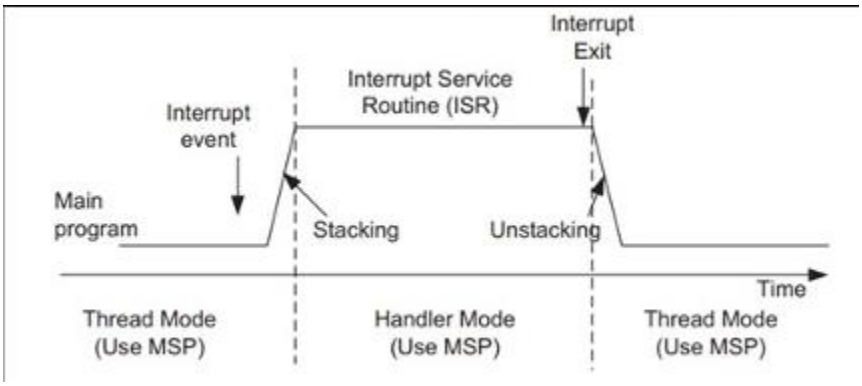


- Cortex M Processor use stack memory model called “Full Descending Stack”
- For each Push:
    1. Processor decrement SP.
    2. Store Value in Memory.
- For each POP:
    1. Reading Value from memory location as SP point.
    2. Then increment value of SP.



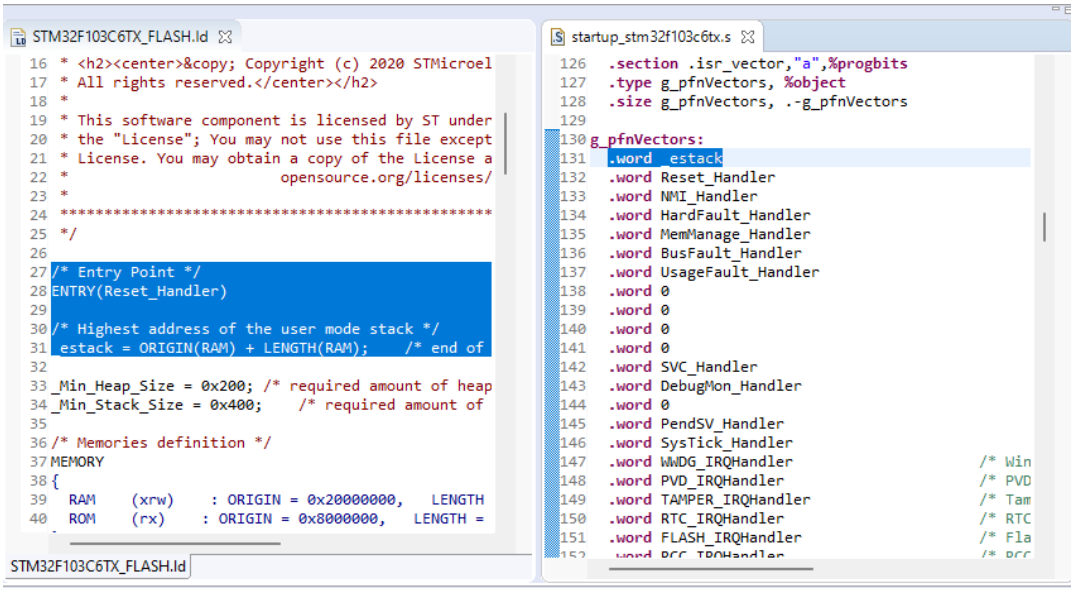
✓ Physically There are two stack pointers in Cortex M Processor

- Main Stack Pointer:
    - This is the default stack pointer used after reset/power ON and used in Exceptional Handlers.
- Process Stack Pointer:
    - This is alternative stack pointer used only on Thread mode.
    - It’s usually used in Application Tasks in embedded system running on Embedded OS.

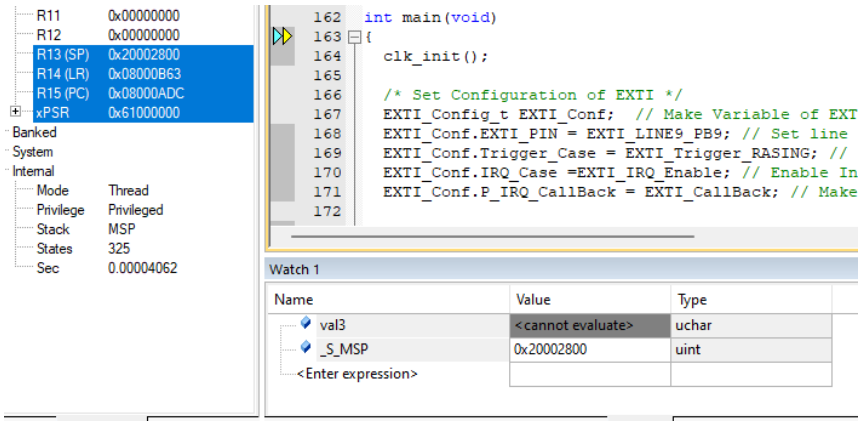


Lab:

- We Will use estack as stack top and start of main stack pointer.

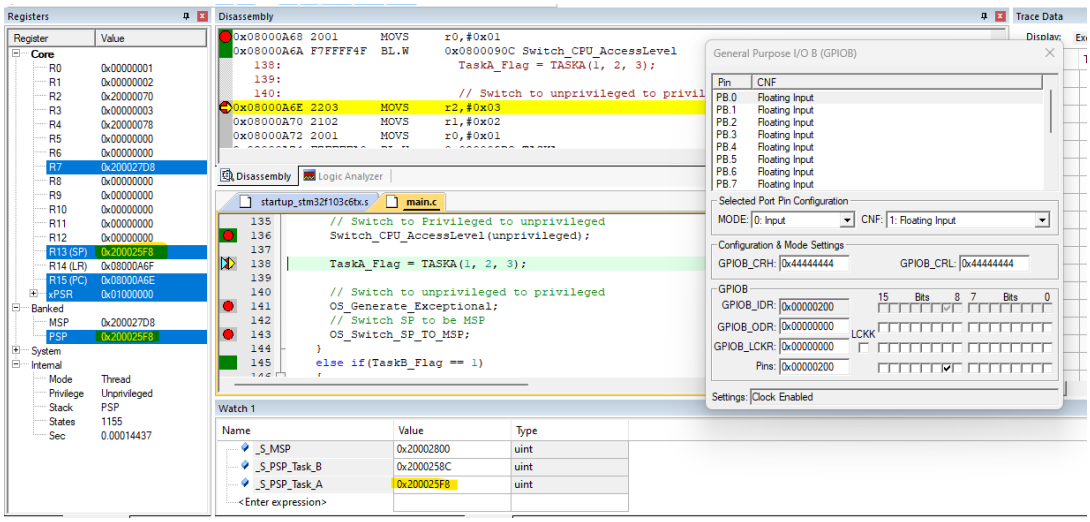


- **Notices**
  - that when we start the Firmware SP stopped at address 0x20002800
  - We work for STM32F103C6 SRAM length is 10K bytes (10 * 1024 = 0x2800)
  - Start of SRAM(0x20000000) the result is 0x200002800
  - Start of MSP set on same address.



➢ After first trigger:

- PSP carry address of Start_TaskA.
- SP switch from MSP to PSP.
- switch from privileged to unprivileged.



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