# **OBJECTIVES:**

* To examine the stack.

# **MATERIAL:**

* Atmel Studio.

# **WEB SITES:**

* [www.microchip.com](http://www.microchip.com/) for Atmel Studio Software

# **ACTIVITY 1**

Write and assemble a program to load values $20, $31, $42, $53, and $64 into each of registers R20 to R24 and then push each of these registers onto the stack. Single-step the program, and examine the stack and the SP register after the execution of each instruction.

# **ACTIVITY 2**

Write and assemble a program to:

1. Set SP = $29D,
2. Store (without using push operation) a different value 6, 5, 4, 3, 2 ,1 in RAM locations $29D, $29C, $29B, $29A, $299, and $298, respectively
3. POP each stack location into registers R20 – R24.
4. Use the simulator to single-step and examine the registers, the stack, and the stack pointer.

**From Activity 1 and 2, answer the following questions:**

1. Upon reset, what is the value in the SP register?
2. Upon pushing data onto the stack, the SP register is \_\_\_\_\_\_\_\_\_\_\_\_\_ (decremented, incremented).
3. Upon popping data from the stack, the SP register is \_\_\_\_\_\_\_\_\_\_\_ (decremented, incremented).
4. Can you change the value of the SP register? If yes, explain why you would want to do that.