The 8085 Programming Model

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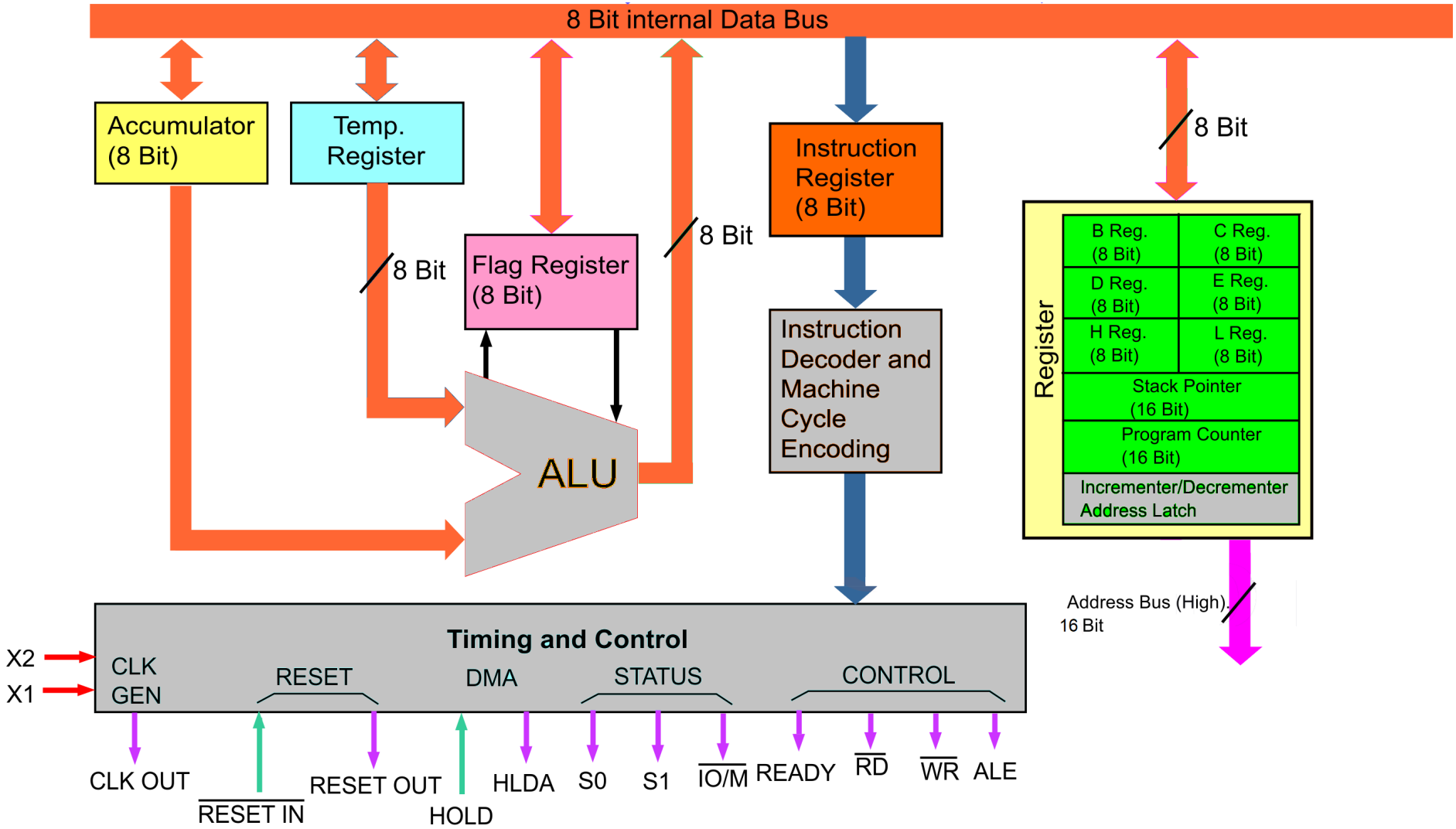
Microprocessor Architecture, 2019


بسم الله الرحمن الرحيم

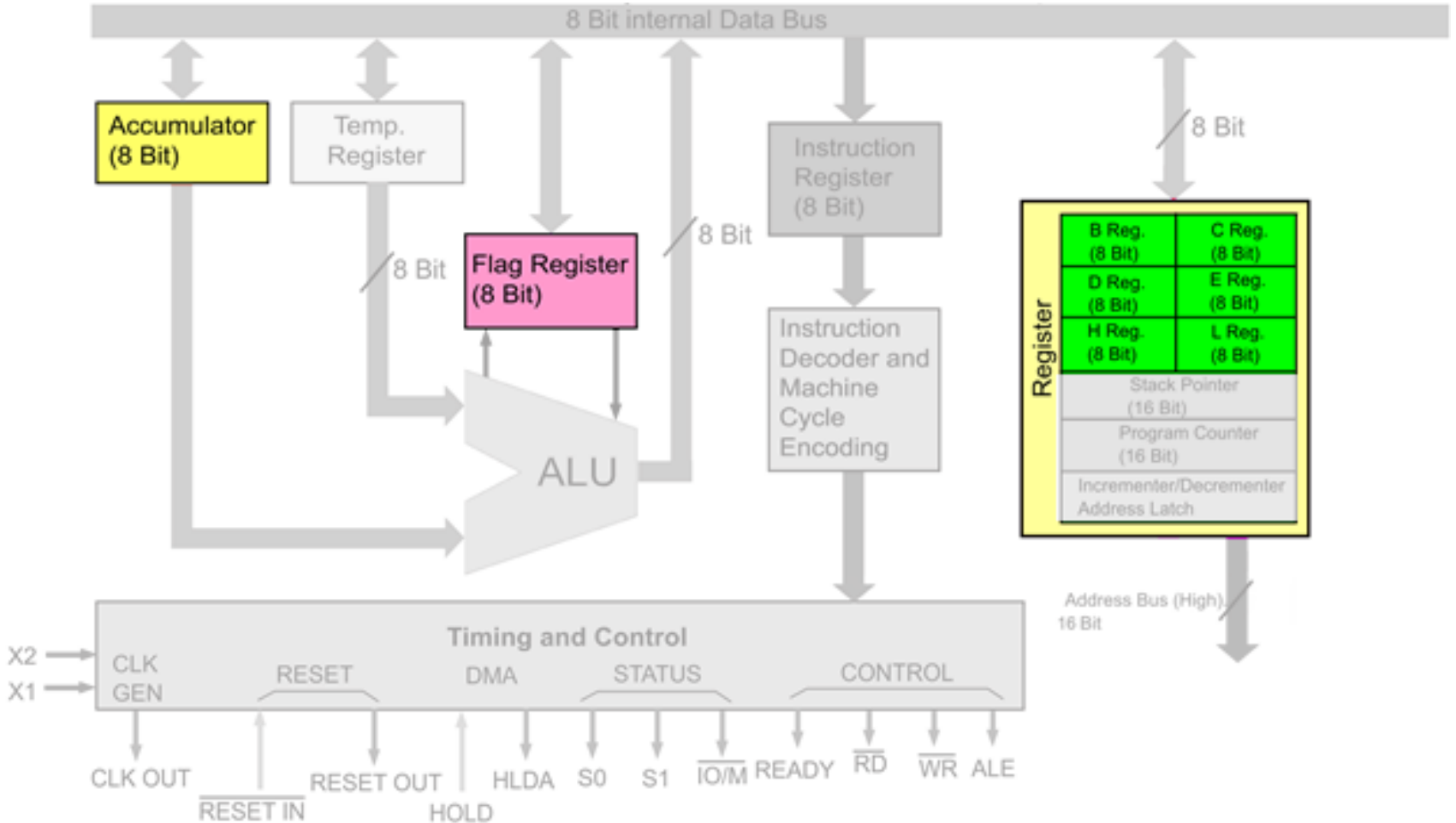

وقل رب زدني علما

General Registers

8085 Programming Model

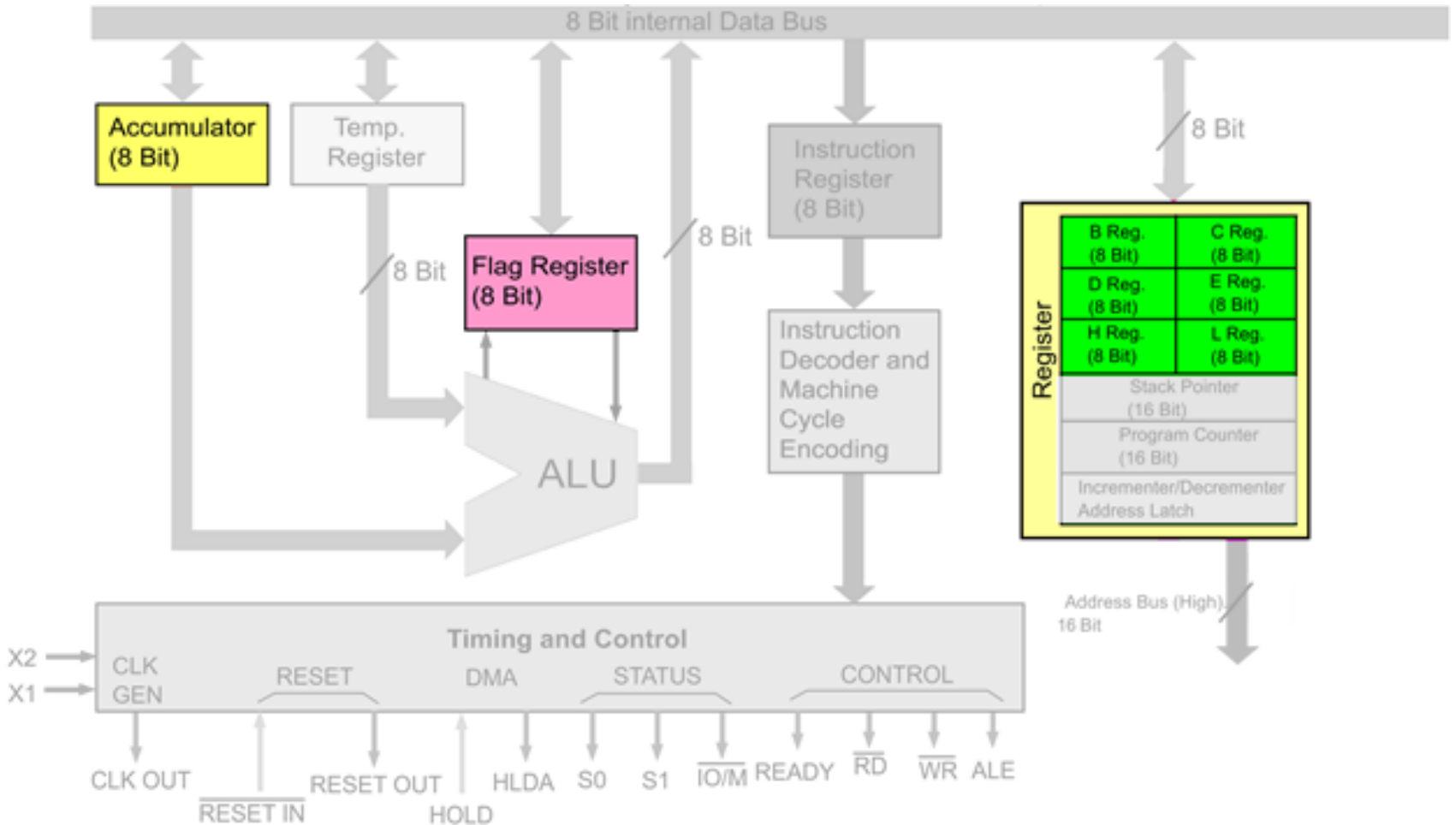


8085 Programming Model:Accumulator (8 bit register)



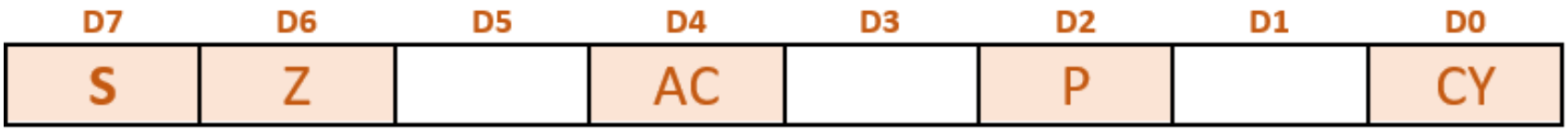
1. Store 8 bit data & perform arithmetic and logical operations.
2. Store the result of an operation.
3. Store 8 bit data during I/O transfer.

8085 Programming Model:Flag Register (8 bit register)



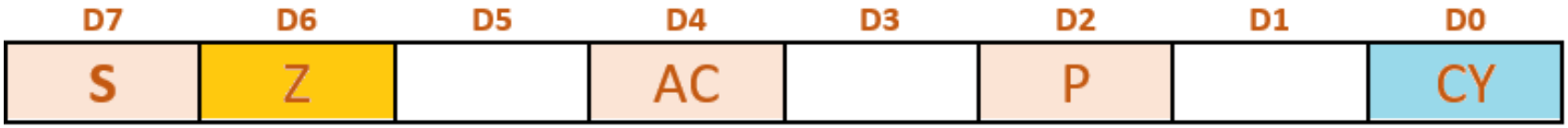
1. Set or reset after an operation according to data conditions of the result in the accumulator and other registers

8085 Programming Model:Flag Register (8 bit register) (Cont.)



1. **S:** Sign flag is set when result of an operation is negative.
2. **Z**: Zero flag is set when result of an operation is 0.
3. **AC**: Auxiliary carry flag is set when there is a carry out of lower nibble or lower four bits of the operation.
4. **P**: Parity flag is set when result contains even number of 1's.
5. **CY**: Carry flag is set when there is carry generated by an operation.

8085 Programming Model:Flag Register (8 bit register) (Cont.)




```
  10110011
+ 01001101
--------------
1 00000000
```

```
     1011 0101
+    0110 1100
--------------
Carry 1  0010 0001
```

```
     1011 0101
-    1100 1100
--------------
Borrow 1  1110 1001
```

1. **Z**: Zero flag is set when result of an operation is 0.
   1. Result obtained after an operation (arithmetical or logical) is 0.
   2. Increment or decrement operation of that register.
2. **CY**: Carry flag is set when there is carry generated by an operation.
   1. Is set if there is a carry or borrow from arithmetic operation.

8085 Programming Model:Flag Register (8 bit register) (Cont.)

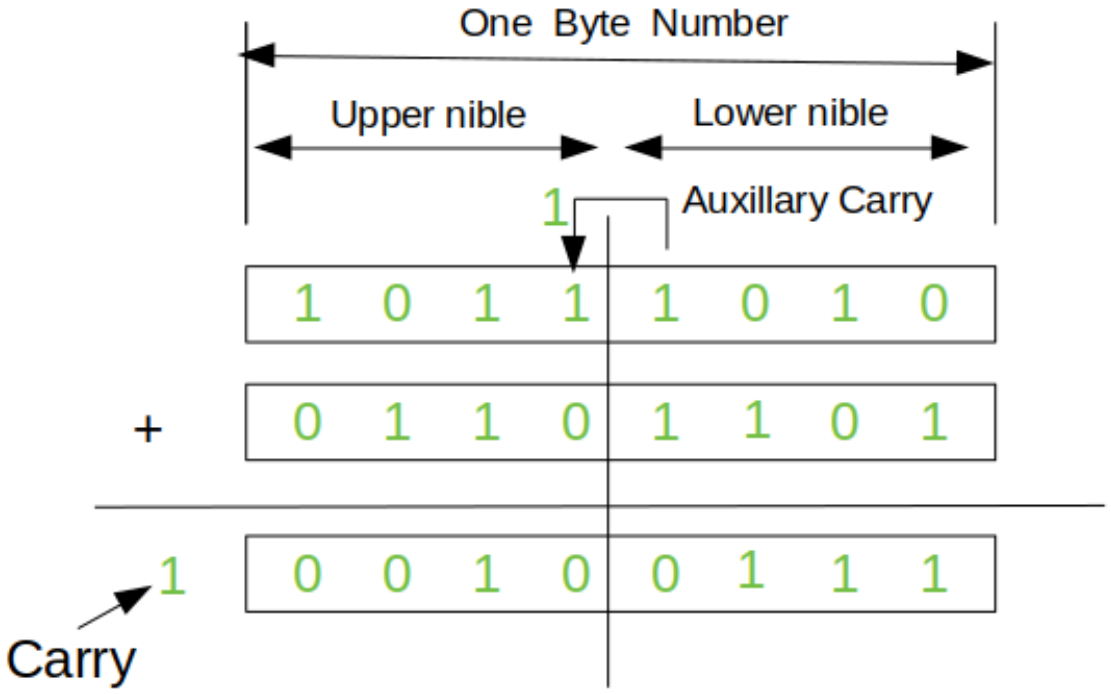
1- MSB is 1 (negative),80H to FF
0- MSB is 0 (positive), 00H to 7F

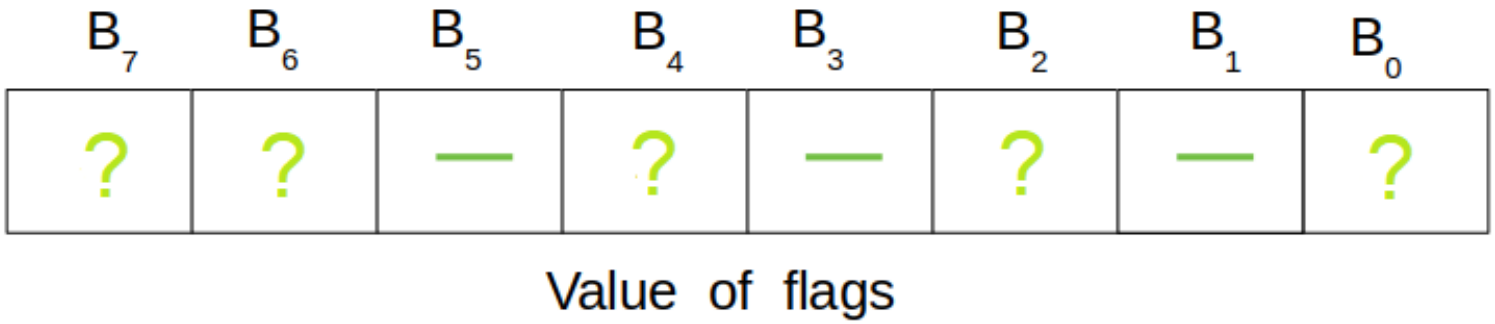
```
  1011 0101
+ 0110 1100
  -----------
1 0010 0001
```

1- Accumulator has even number of 1 bits
0- Accumulator has odd parity

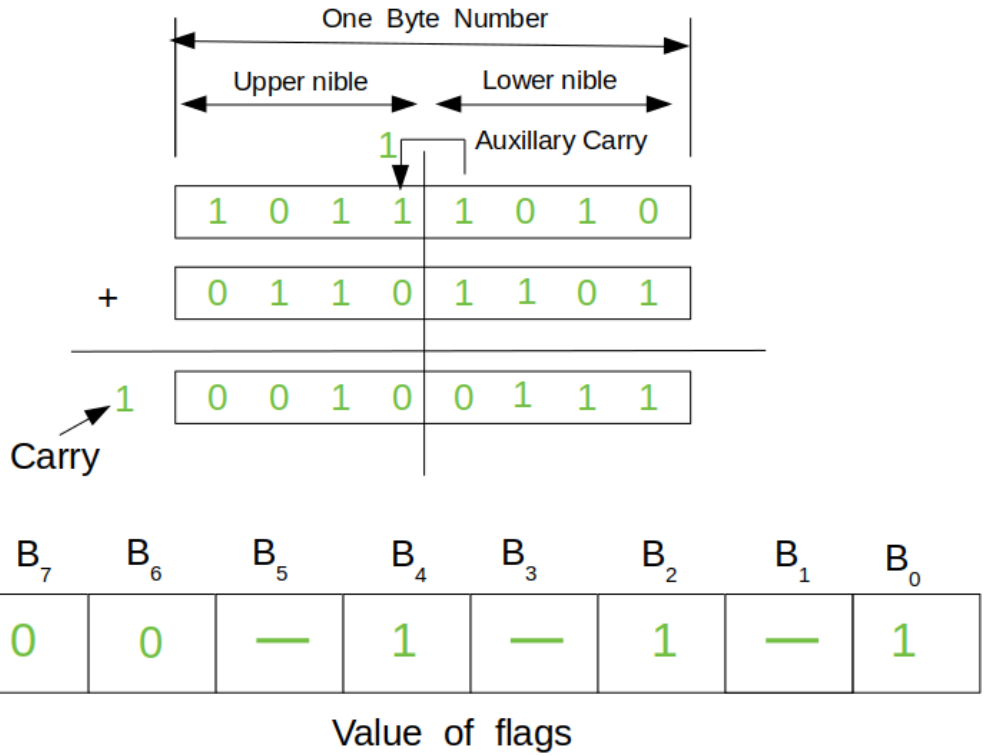
1. **S:** Sign flag is set when result of an operation is negative.
   1. After any operation if the MSB (D7) of the result is 1.
2. **AC**: Auxiliary carry flag is set when there is a carry out of lower nibble or lower four bits of the operation.
3. **P**: Parity flag is set when result contains even number of 1's.

8085 Programming Model:Flag Register (Example)



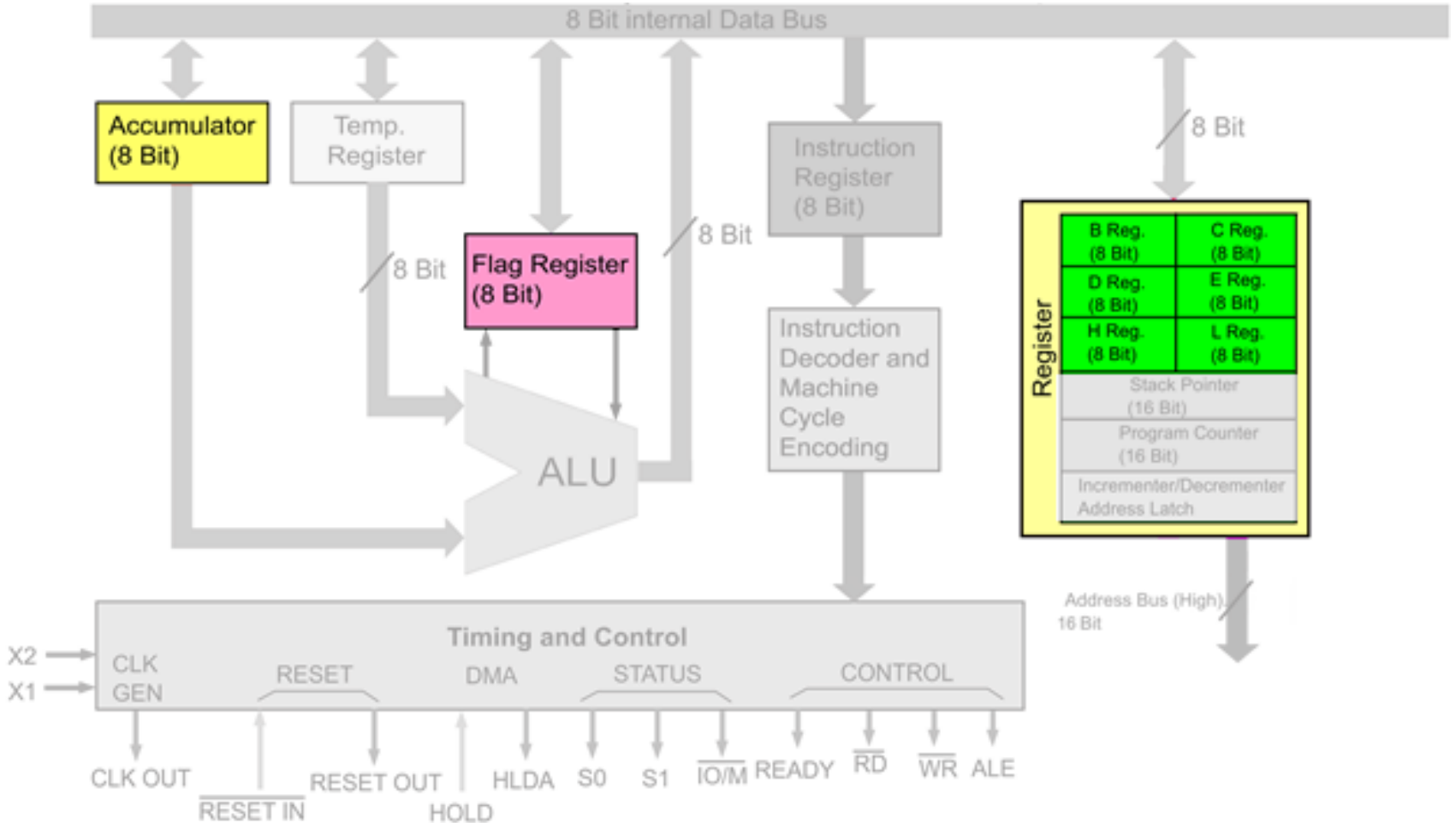


8085 Programming Model:Flag Register (Example)



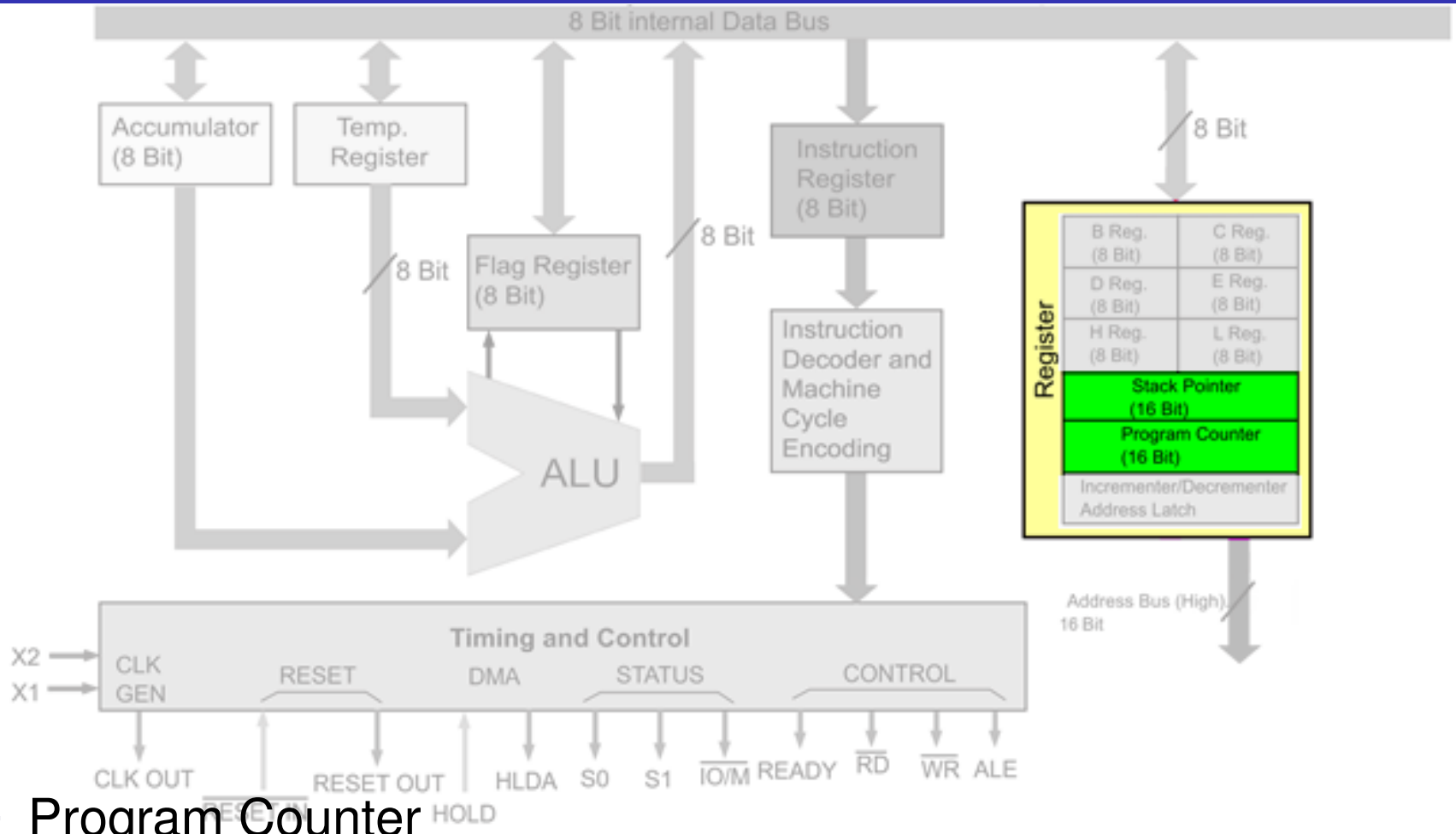
1. **S= 0** : D7=0.
2. **Z=0**: Flag register $\neq$ 0.
3. **AC=1**: there is a carry at bit 3.
4. **P=1**: number of 1's=4 even number.
5. **CY=1**: there is a carry at bit 7.

8085 Programming Model: Six General Purpose Registers(8 bit)



1. 8 bit registers: B, C, D, E, H , L.
2. 16 bit registers pairs: BC, DE, HL.
3. H & L can be used as a data pointer (holds memory address)

8085 Programming Model: Memory Registers (16 bit)



1. Program Counter
   - A pointer to the next instruction to be executed
   - Updated after processor has fetched the instruction
2. Stack Pointer
   - Holds the address of the top of the stack

8085 Programming Model: Memory Registers (16 bit)

1. Program Counter
   - A pointer to the next instruction to be executed
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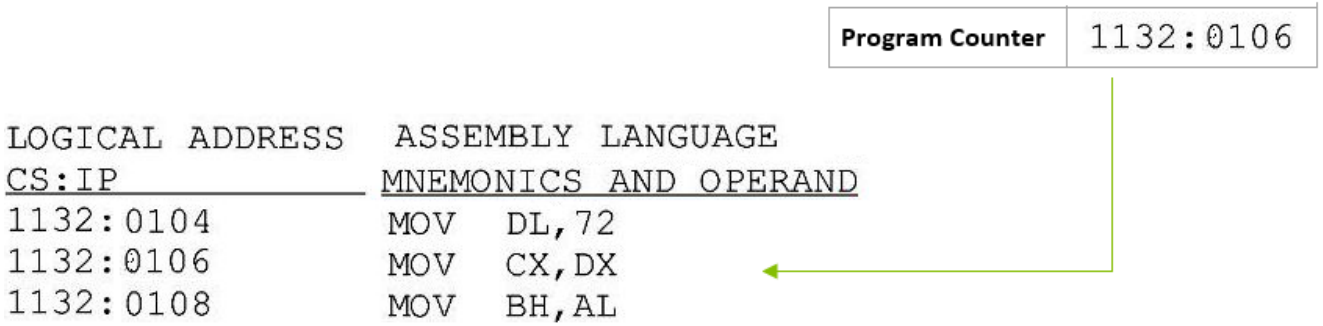

2. Stack Pointer
   - Holds the address of the top of the stack.
   - Stack: FILO (First In Last Out) basis memory.