Word Serial Bit Serial (WSBS): One bit is processed at a time.

Word Parallel Bit Serial (WPBS): Processes m-bit slices at a time.

Word Serial & Bit Parallel (WSBP): One word at a time with bit parallelism.

Word Parallel & Bit Parallel (WPBP): Fully parallel processing.

Handler 's Classification has proposed a classification scheme for identifying the parallelism degree and pipelining degree built into the hardware structure of the computer system. He considers at three subsystem levels:

1. Processor Control Unit (PCU)
2. Arithmetic Logic Unit (ALU)
3. Bit Level Circuit (BLC)

Processor Control Unit (PCU): Represents CPU-level parallelism.

Arithmetic Logic Unit (ALU): Represents computational units.

Bit Level Circuit (BLC): Represents bit-wise operations.

<u>Levels of Parallelism:</u>

Parallelism in computing can be classified into different levels based on how the operations are carried out. Here are four main levels:

1. Instruction-Level Parallelism (ILP):
    a. Involves executing multiple instructions from a program simultaneously.
    b. Achieved through pipelining, superscalar execution and out-of-order execution.
    c. Example:
        i.
```
for (i=1; i<=100; i++)
    y[i] = y[i] + x[i];
```
        ii. Each iteration of this loop can be executed in parallel.
2. Thread-level or Task-level Parallelism (TLP):
    a. Involves executing different tasks or threads concurrently on multiple processors or cores.
    b. Example:
        i. One thread performs matrix multiplication while another thread sorts an array.
3. Data-Level Parallelism (DLP):
    a. Same operation is performed on multiple data points simultaneously.
    b. Example:
        i. A dual core system can sum two halves of an array in parallel.
4. Bit-Level Parallelism (BLP):
    a. Increasing the word-size of a processor to process more bits at once.