B2 LISTENING PRACTICE 6

Listen to the audio and complete the note WITH NO MORE THAN THREE WORDS

A. Main objective of RTL design

- Write (1) _____ RTL codes for the best area, power and speed.

- Different chips may have different priorities:

  - Phone chip: (2) _____ .
  - PC chip: (3) _____

- Example: 4-bit adder

  - Ripple carry adder: saves area and power.
  - Carry look-ahead adder: improves(4) _____.

B. Level 1 projects

- (5) _____: performs four basic operations (addition, subtraction, division and multiplication).
- Multi-bit barrel (6) _____.
- BCD up-down counter.

C. Level 2 projects

- Start using FSMs (Finite State Machines).
- Before writing RTL code:
  1. Draw a state diagram.
  2. Create a (7) _____.
  3. Write the RTL code using a (8) _____.

- Example: If the current state is S0 and the input is 1, the next state is S1.

- Project examples:

  - (9) _____
  - Vending machine.
  - (10) _____
  - FIFO (First In, First Out).

D. Advanced Level 2 project

- Design a system consisting of data unit and (11) _____.

- Project: Design a code (12) _____ to convert:

  - 8-bit binary to 8-bit Gray code.
  - 8-bit Gray code to 8-bit binary.

LIVEWORKSHEETS

- The control unit uses Moore-based FSM.

E. Level 3 projects

- Implement a (13) _____ RISC-V and MIPS processor.
- Identify the (14) _____ of RISC-V and try to improve its design.
- Another project: Design a (15) _____ unit for the K-means clustering algorithm.
- Build a (16) _____ .

F. K-means clustering algorithm

- The objective is to group data points into clusters.
- First, select initial centroids
- Calculate the (17) _____ between each point and the centroids.
- Assign each point to its (18) _____ centroid.
- Calculate new centroids for each cluster.
- Repeat the process:
    - Calculate distances again.
    - Reassign data points.
    - Update centroids.
- Continue until (19) _____ are formed.
- All numbers are stored in FP16 format (binary floating-point representation).
- (20 _____ hold numbers in FP16 format.

LIVEWORKSHEETS