**Identify a real world application for both parallel computing and network systems. Explain how technologies are used and why they are important in that context.**

**EXAMPLE 1:**

**Real-World Application: Self-Driving Cars**

**1. Parallel Computing in Self-Driving Cars**

* Self-driving cars use multiple sensors: cameras, LIDAR, radar, GPS, etc.
* These sensors generate massive amounts of data every second.
* The car’s onboard computer uses parallel computing (often with GPUs) to:
  + Detect objects (like cars, people, signs)
  + Understand surroundings in real time
  + Make split-second driving decisions

It has a special computer that works on many things at the same time:

* Watching the road
* Noticing people
* Understanding traffic signs
* Planning where to go next

This is called parallel computing.

**Why It's Important:**

Enables cars to perform multiple tasks simultaneously — like tracking multiple moving objects while planning a route.

**2.Network Systems in Self-Driving Cars**

Self-driving cars use network systems to connect and communicate with:

1. Cloud – to get maps, traffic info, and updates.
2. Traffic systems – like traffic lights and road signs (V2I).
3. Other cars – to share speed, location, and avoid crashes (V2V).

They use 5G, Wi-Fi, or DSRC to send and receive data in real-time.

**Why it matters:**

* Helps the car drive smarter and safer.
* Gives real-time info.

**EXAMPLE 2:** **Real-World Application: Online Banking Systems**

**1. Parallel Computing in Online Banking**

* Banks process millions of transactions every second (deposits, withdrawals, transfers).
* They use parallel computing in their data centers to handle many transactions at the same time.
* Multiple servers and CPUs work together to:
  + Verify transactions
  + Check fraud detection algorithms
  + Update account balances instantly

**2. Network Systems in Online Banking**

* When you log in from your phone or ATM, your device connects to the bank’s servers through the internet or private networks.
* The system securely sends your request and receives responses