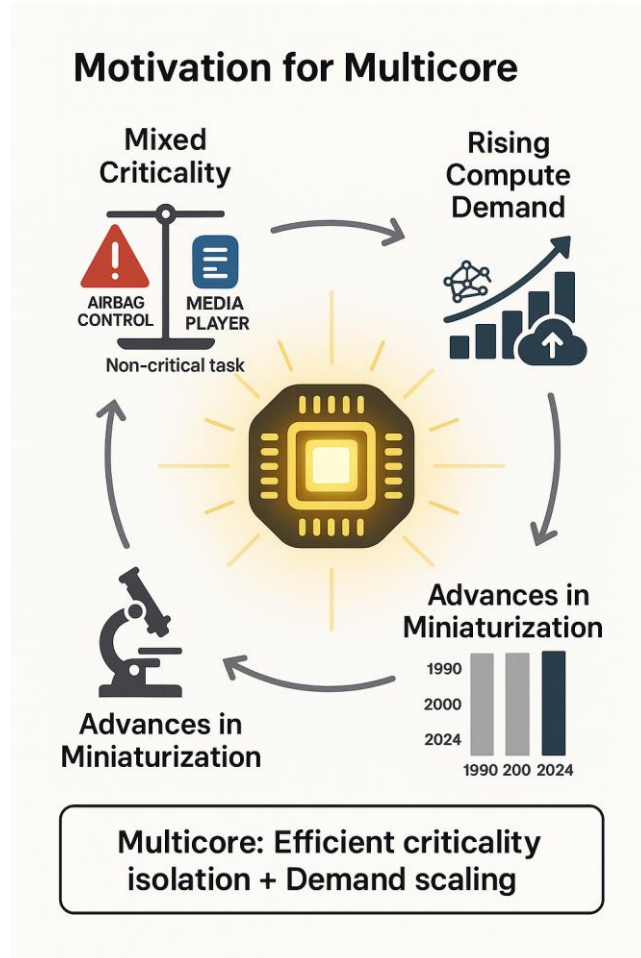


# PARTITION- BASED SCHEDULING

Multicore Systems

# MOTIVATION

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- **Advantages:**

- Task isolation and mutual interference [2].
- Parallel task execution [4].
- Enhances energy efficiency.
- Higher bandwidth [6].
- Lower communication latency [5].

Fig. 1: Motivation for multi-core systems [8].

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# SCHEDULING MULTI-CORE SYSTEMS

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- Two fundamental approaches:
  - **Global Scheduling:** Task may execute on any core and migration is allowed.
  - **Partition-based scheduling:** Tasks statically assigned to cores.

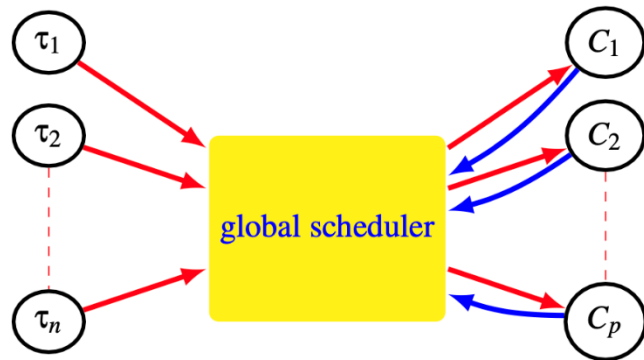


Fig. 2: Global Scheduling [7].

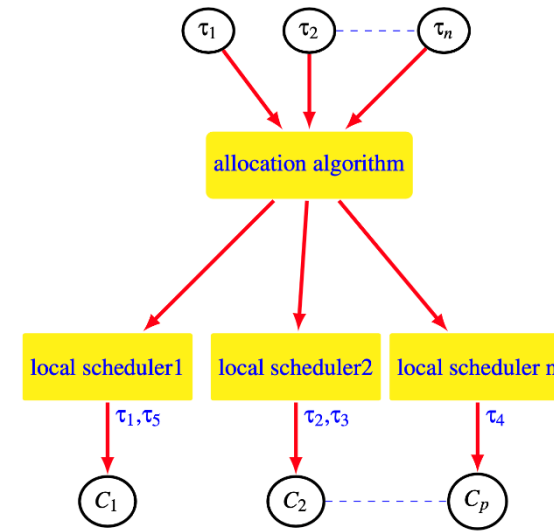


Fig. 3: Partition-based scheduling [7].

# SEMI-PARTITIONED SCHEDULING

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**Semi-partitioned** : Tasks statically assigned to fixed cores.

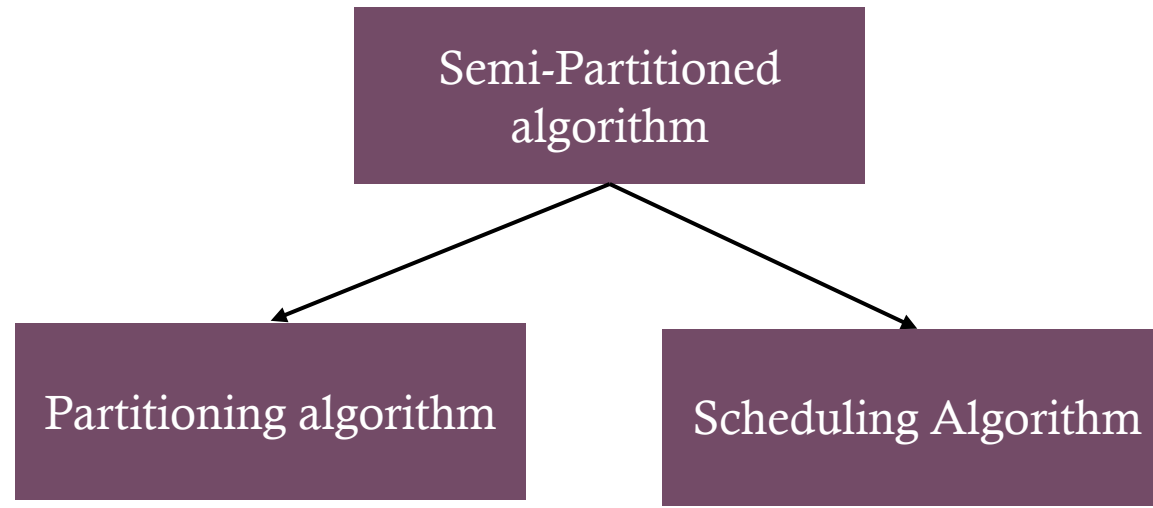


Fig. 4: Parts of semi-partitioned algorithm.

# PROPOSED STRATEGY

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**Goal:** Reduced Communication Cost between cores.

**Partitioning algorithm:** Clustering-based.

**Scheduling algorithm:** Earliest Deadline First (EDF).

Fig. 6: Proposed strategy and goal.

# MODELLING SCHEDULER

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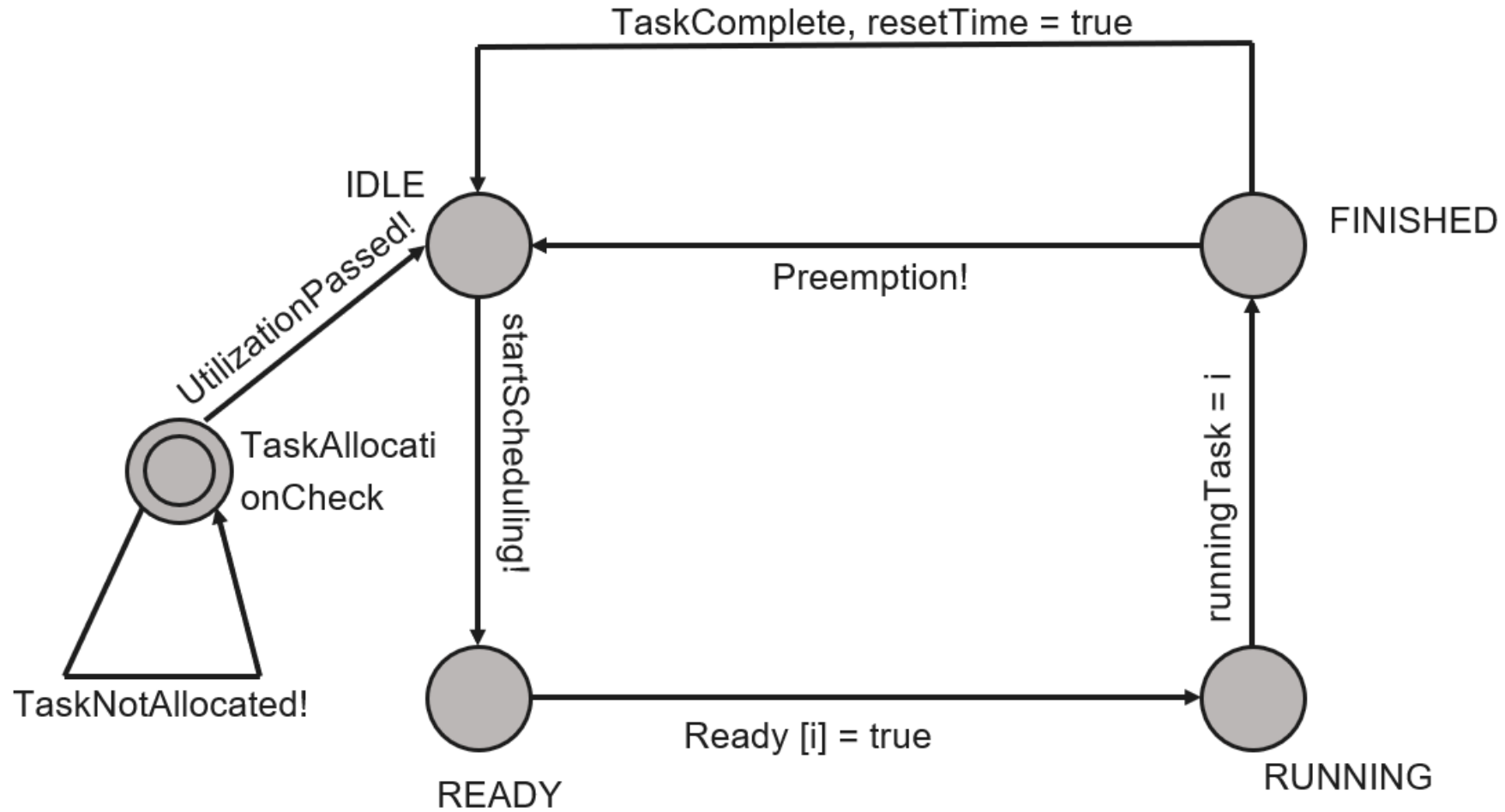


Fig. 8: Modelling of scheduler

# IMPLEMENTATION AND EXAMPLE

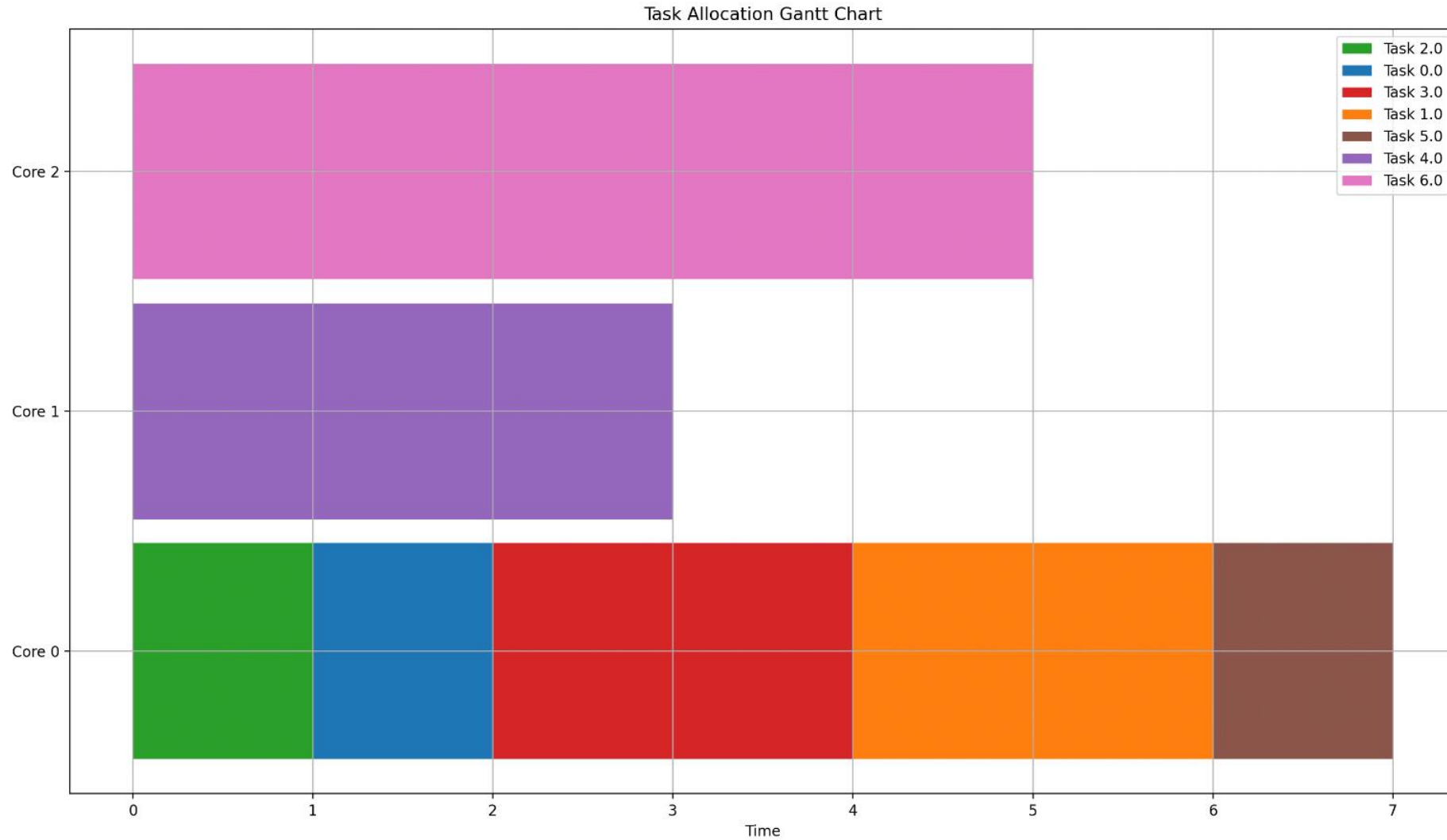


Fig. 7: Task dependency matrix

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# OVERVIEW AND CONCLUSION



Semi-partition scheduling on multi-core systems is decided upon.



Implementation in C with FreeRTOS (Repository).



Simulation illustrated in UPPAAL.



Tasks with frequent communication formed cluster.



Clusters allocated on nearby cores, with schedulability constraints.



Communication cost reduced.



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