

ENERGY PERFORMANCE-AWARE TASK SCHEDULING IN MOBILE CLOUD COMPUTING ENVIRONMENT

Presentation by Alex Kramer



NODE CLASS

- Attributes: Task ID, Number of Cores, Parents and Children, Core Speeds and Cloud Speeds
- Timing Information: Finish Time (FT) local, FT cloud, FT wireless send, FT wireless receive, ready time
- Primary Assignment: method determines whether the task should be executed locally or in the cloud (based on core & cloud speeds)
- Task Prioritization: calculates priority score based on primary assignment

PRIORITY ORDER

- This function calculates a priority order for the tasks based on the various parameters such as core speeds and task characteristics
- This is one of the functions that significantly influences the scheduling decisions, determining which tasks get precedence over others.
- When we look at test cases, we will notice that any differences from the papers' results and mine are due to priority order.
- The priority order dynamically adjusts based on real-time conditions, ensuring adaptability to changing computational requirements.

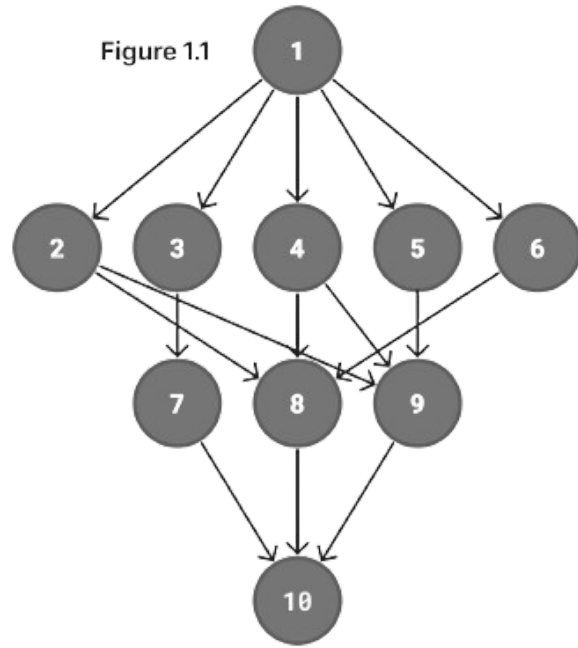
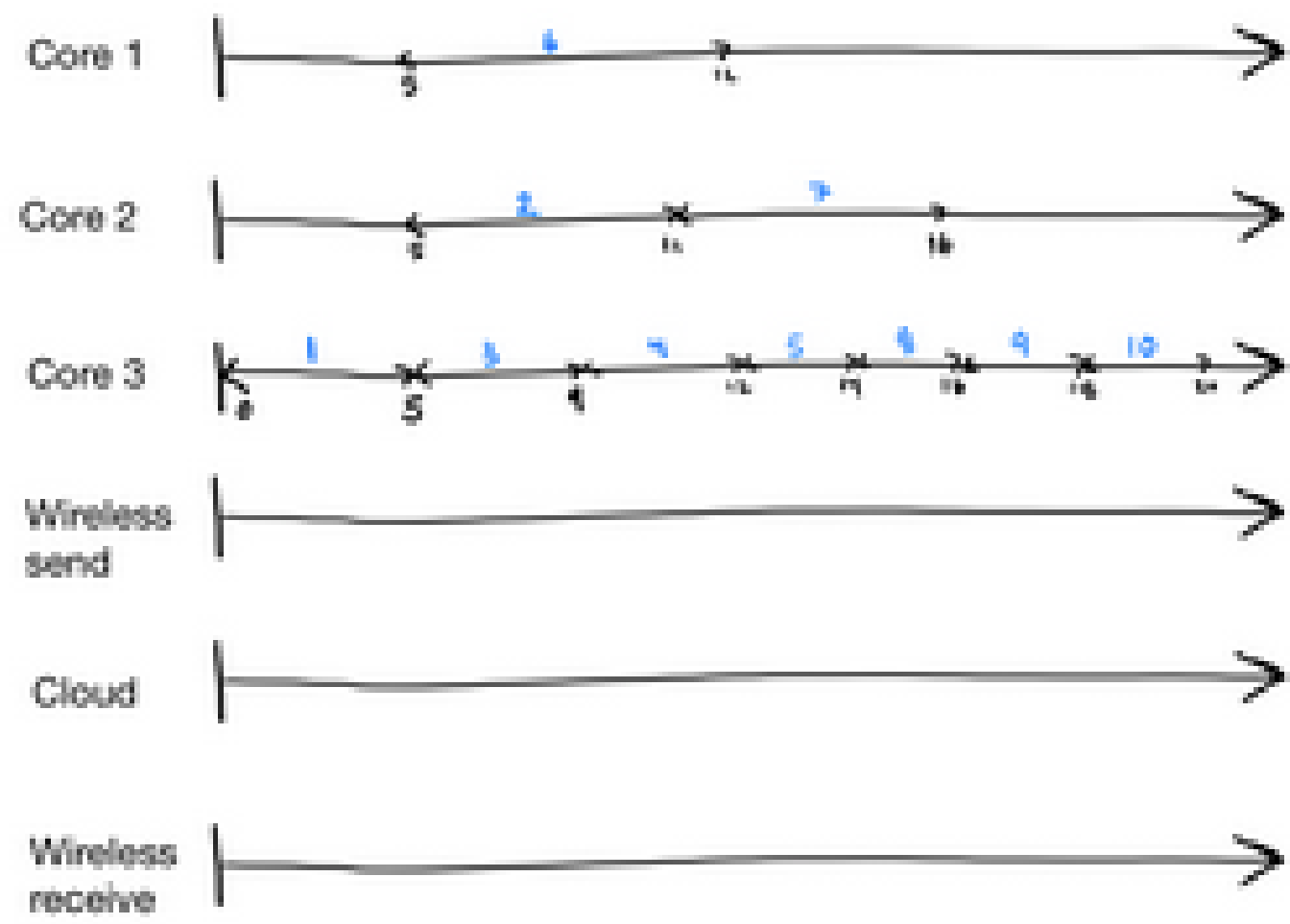
EXECUTION UNIT SELECTION

- Program dynamically decides whether a task should be executed locally or offloaded to the cloud.
- Tasks are dynamically assigned to local cores or the cloud based on varying factors like task characteristics, device resources and energy consideration.
- Execution Unit Selection: it continuously assesses core and cloud speeds, adapting to the changing computational landscape and ensuring tasks are executed efficiently

KERNEL ALGO

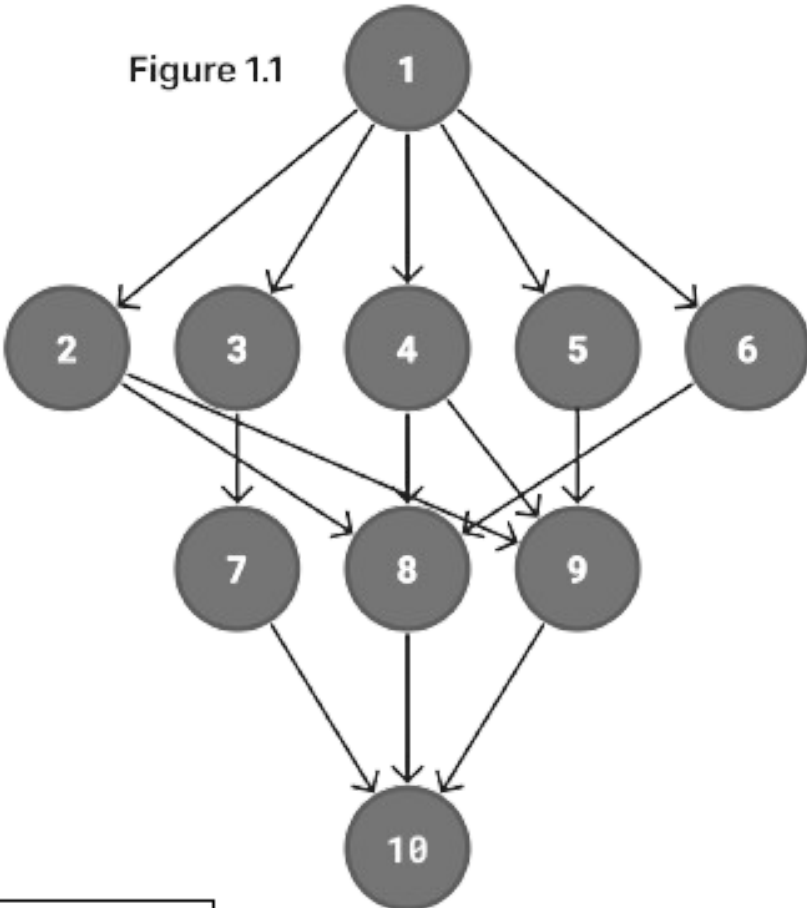
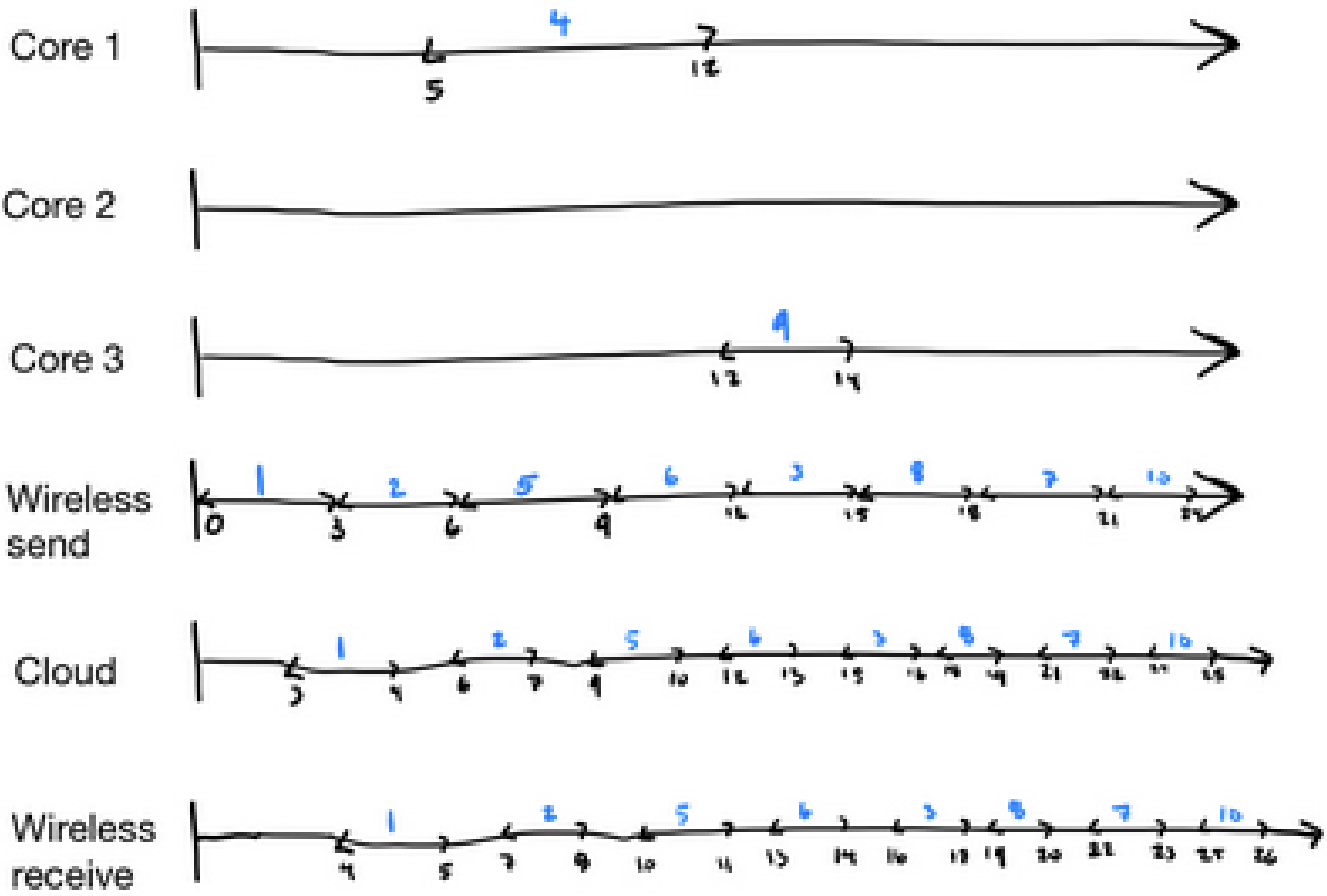
- Serves as the core of our scheduling process, making critical decisions on task placement.
- Plays a pivotal role in optimizing task scheduling by considering a range of factors, including task characteristics, device resources, and energy constraints.
- Kernel algorithm dynamically optimizes task scheduling, ensuring that each task is assigned to the most suitable execution unit for efficient processing.

TEST CASE 1



Task	Core 1	Core 2	Core 3
1	9	7	5
2	8	6	5
3	6	5	4
4	7	5	3
5	5	4	2
6	7	6	4
7	8	5	3
8	6	4	2
9	5	3	2
10	7	4	2

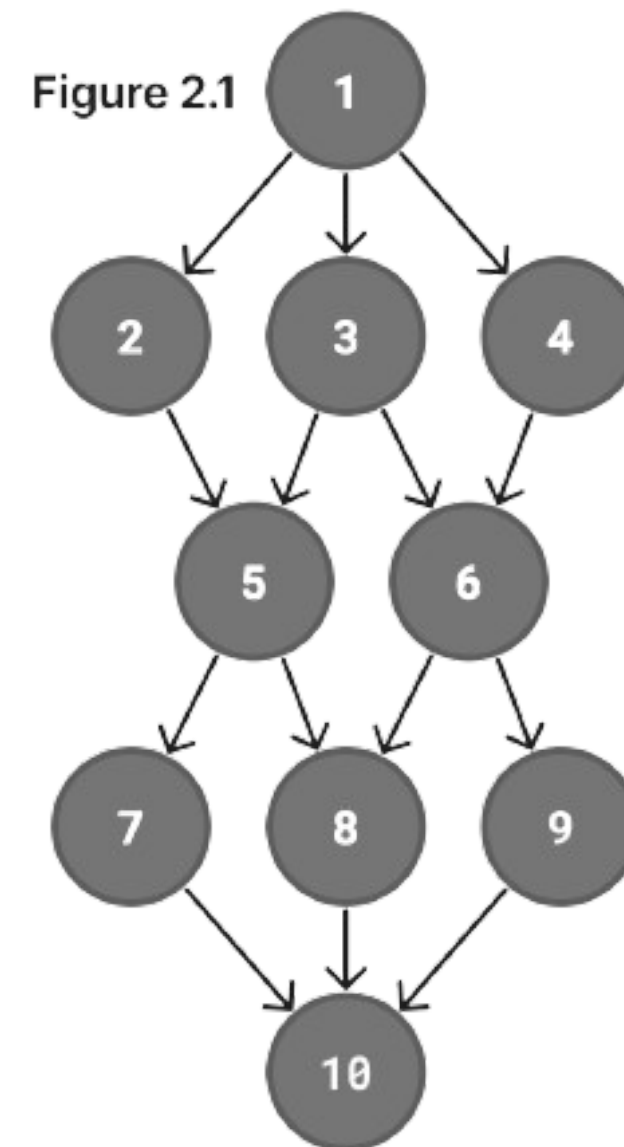
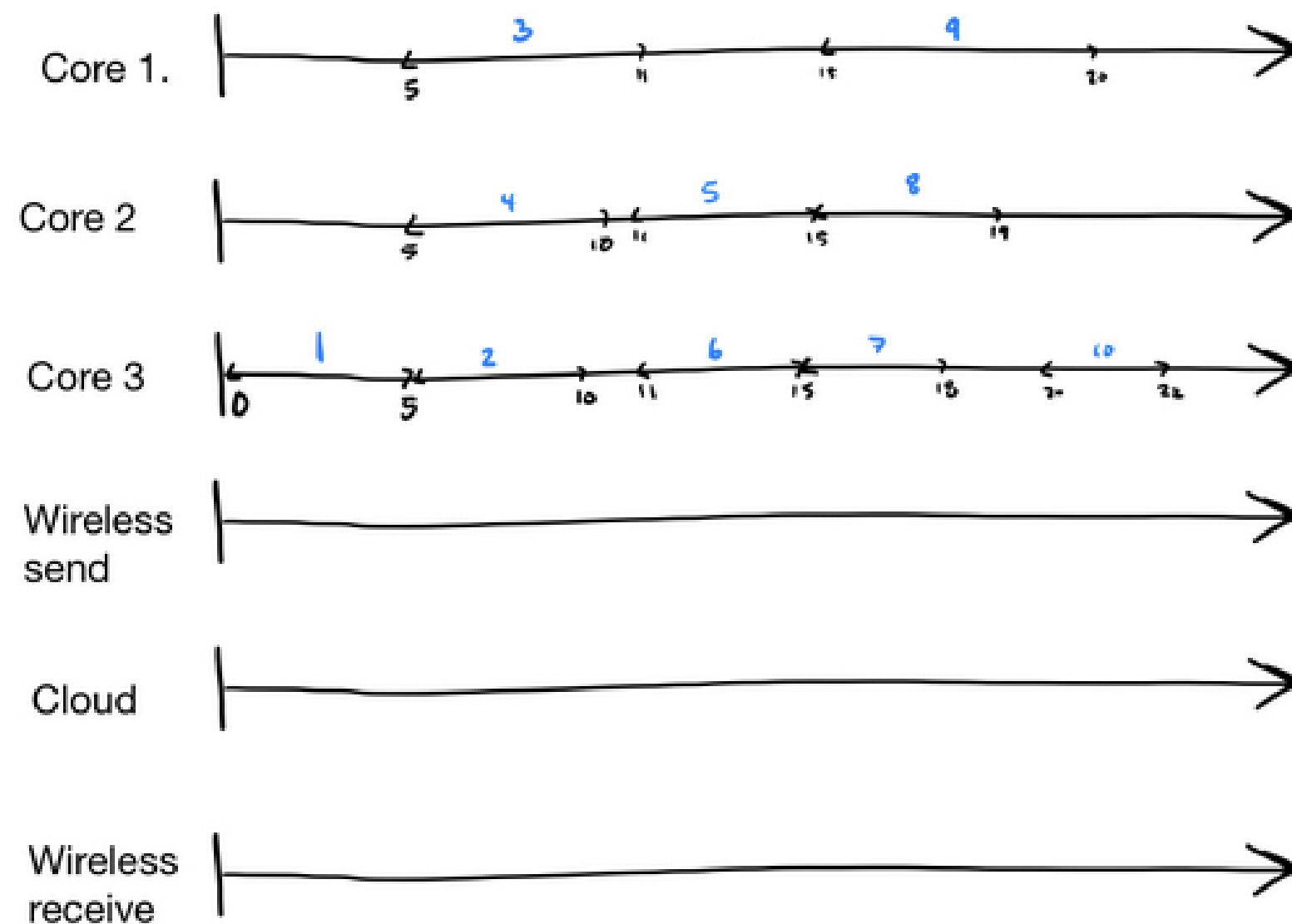
TEST CASE 1



Task	Core 1	Core 2	Core 3
1	9	7	5
2	8	6	5
3	6	5	4
4	7	5	3
5	5	4	2
6	7	6	4
7	8	5	3
8	6	4	2
9	5	3	2
10	7	4	2

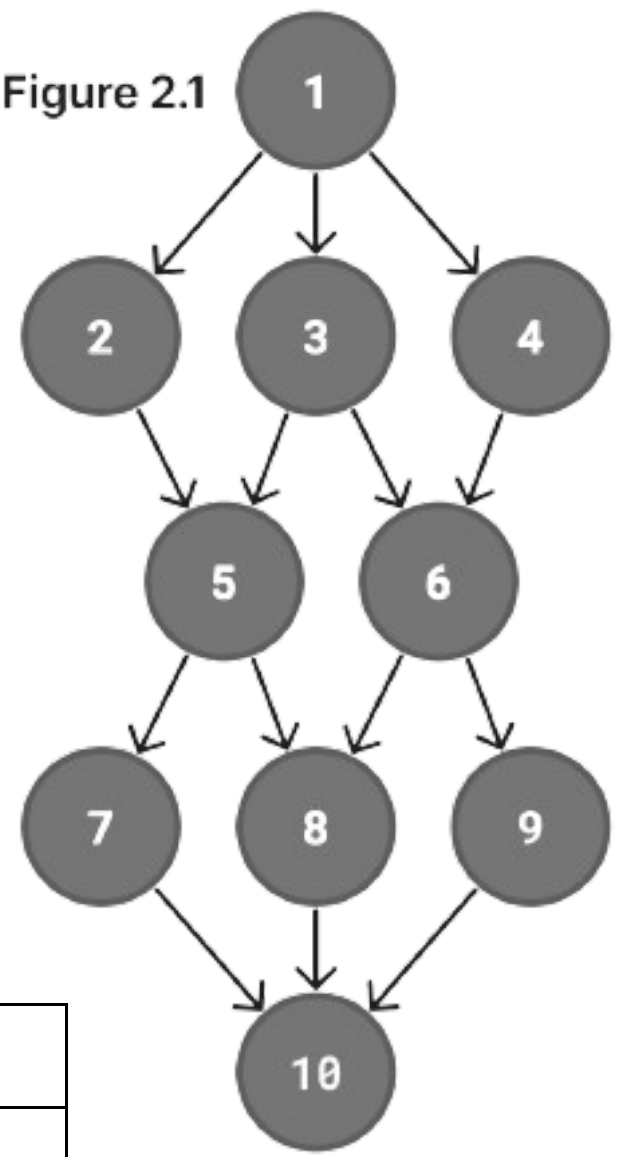
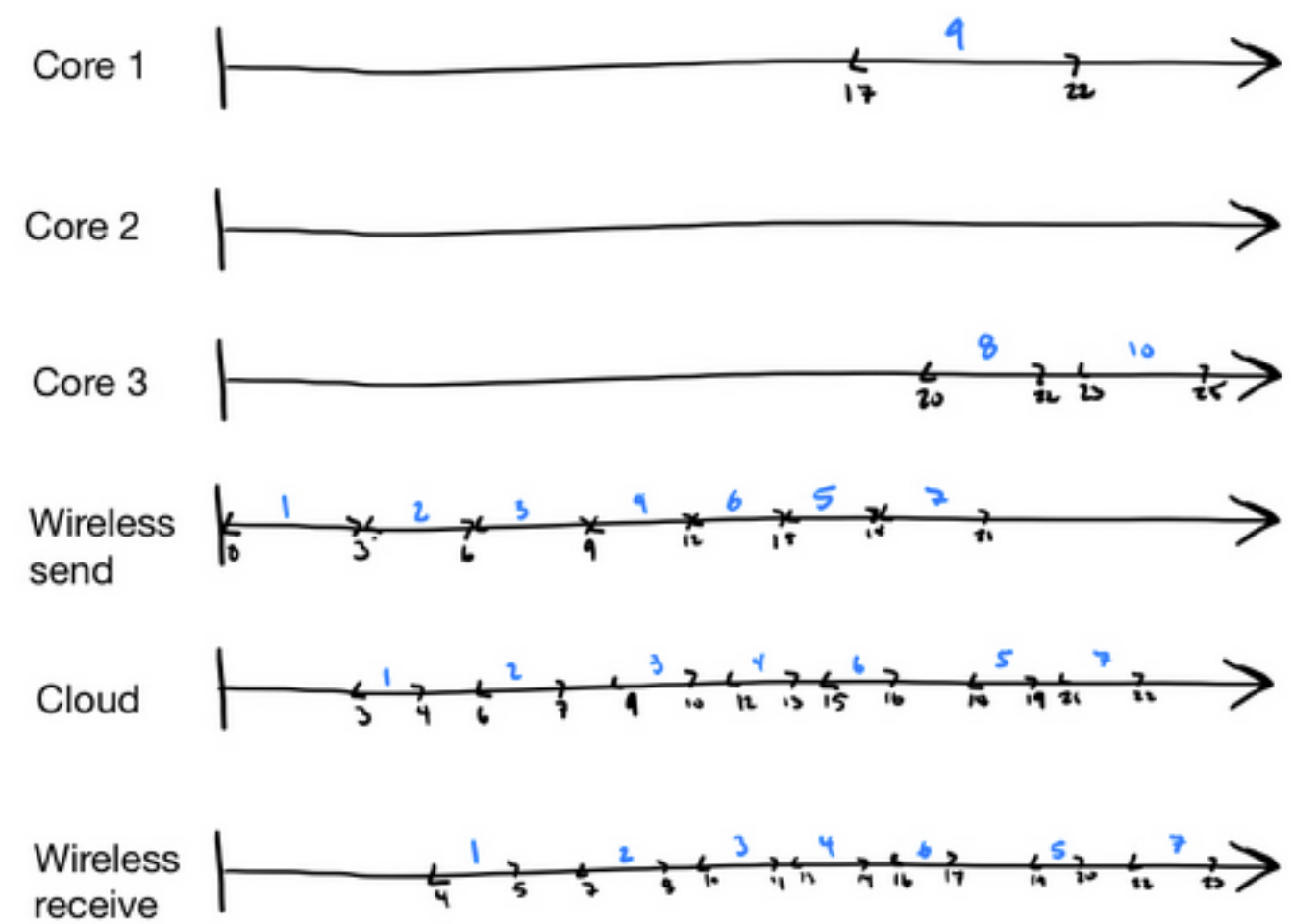
Initial Time	Final Time	Initial Energy	Final Energy
20	26	109	24

TEST CASE 2



Task	Core 1	Core 2	Core 3
1	9	7	5
2	8	6	5
3	6	5	4
4	7	5	3
5	5	4	2
6	7	6	4
7	8	5	3
8	6	4	2
9	5	3	2
10	7	4	2

TEST CASE 2



Task	Core 1	Core 2	Core 3
1	9	7	5
2	8	6	5
3	6	5	4
4	7	5	3
5	5	4	2
6	7	6	4
7	8	5	3
8	6	4	2
9	5	3	2
10	7	4	2

Initial Time	Final Time	Initial Energy	Final Energy
22	25	113	31.5

TEST CASE 3

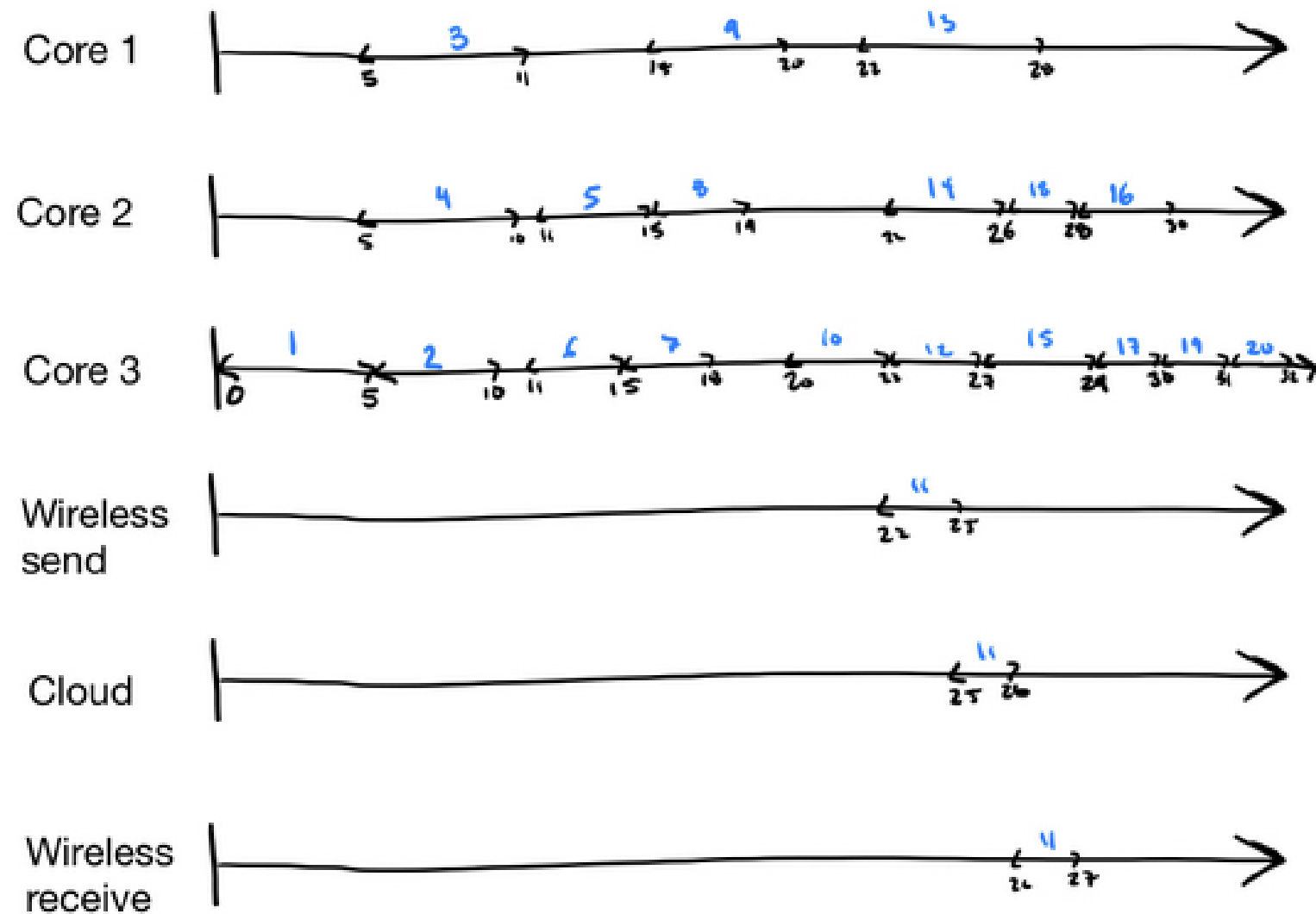
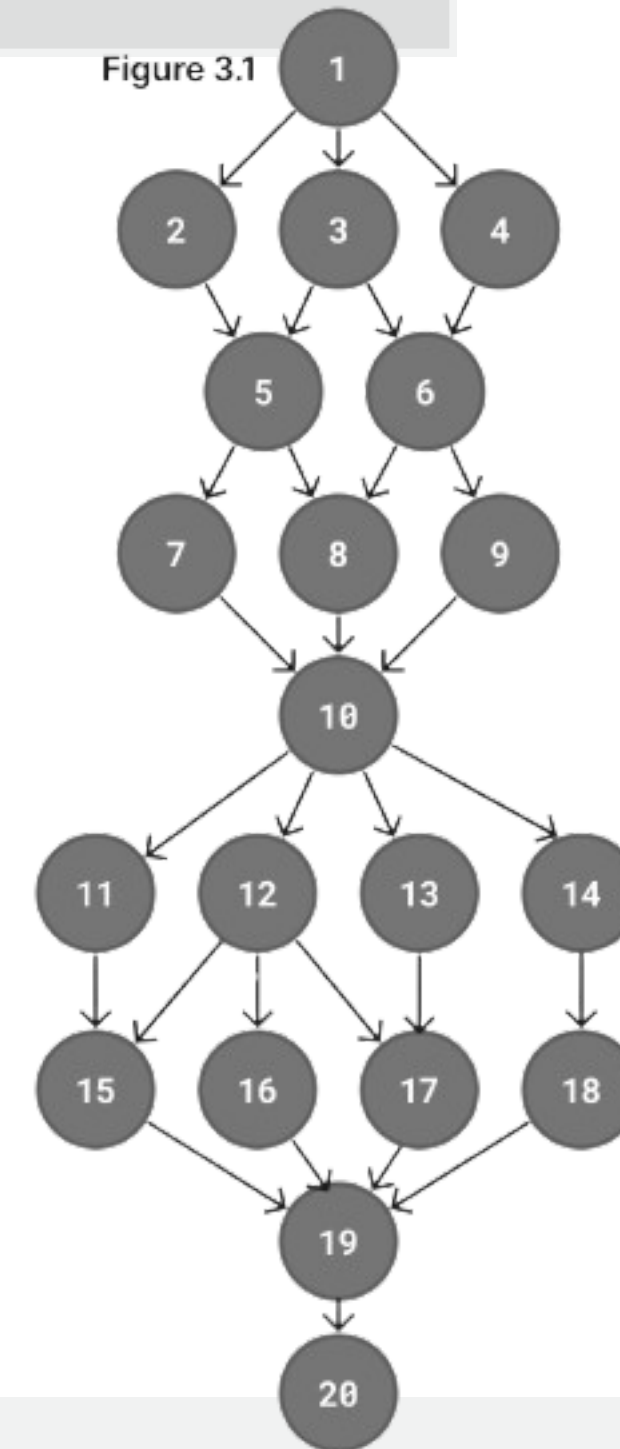
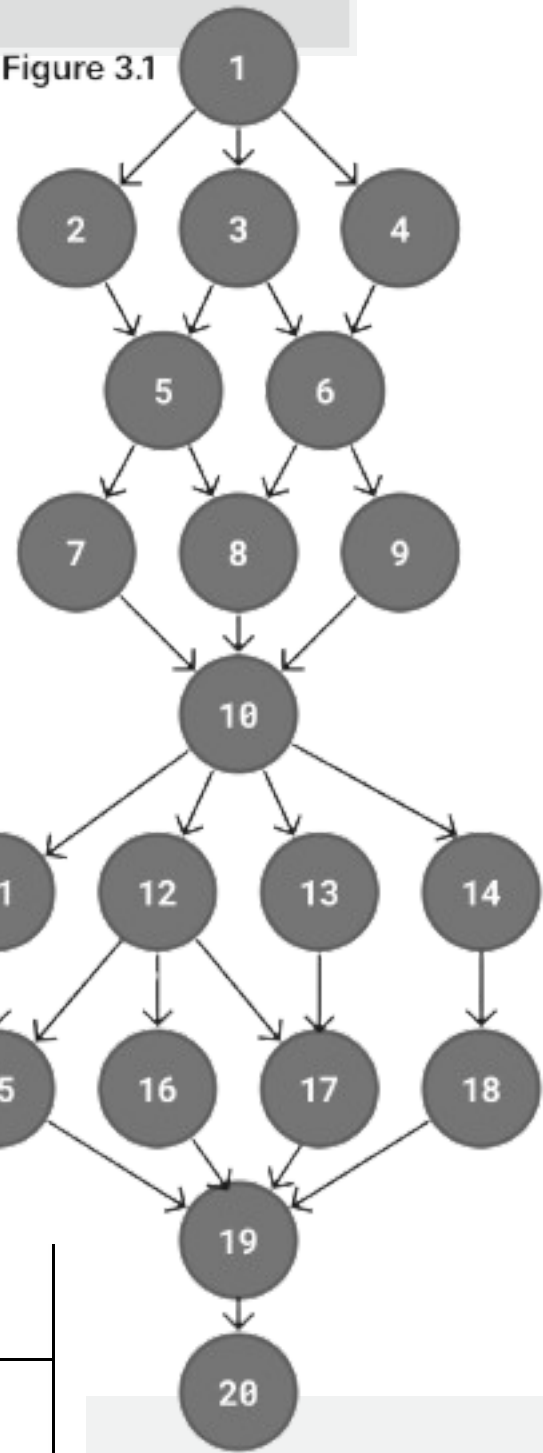
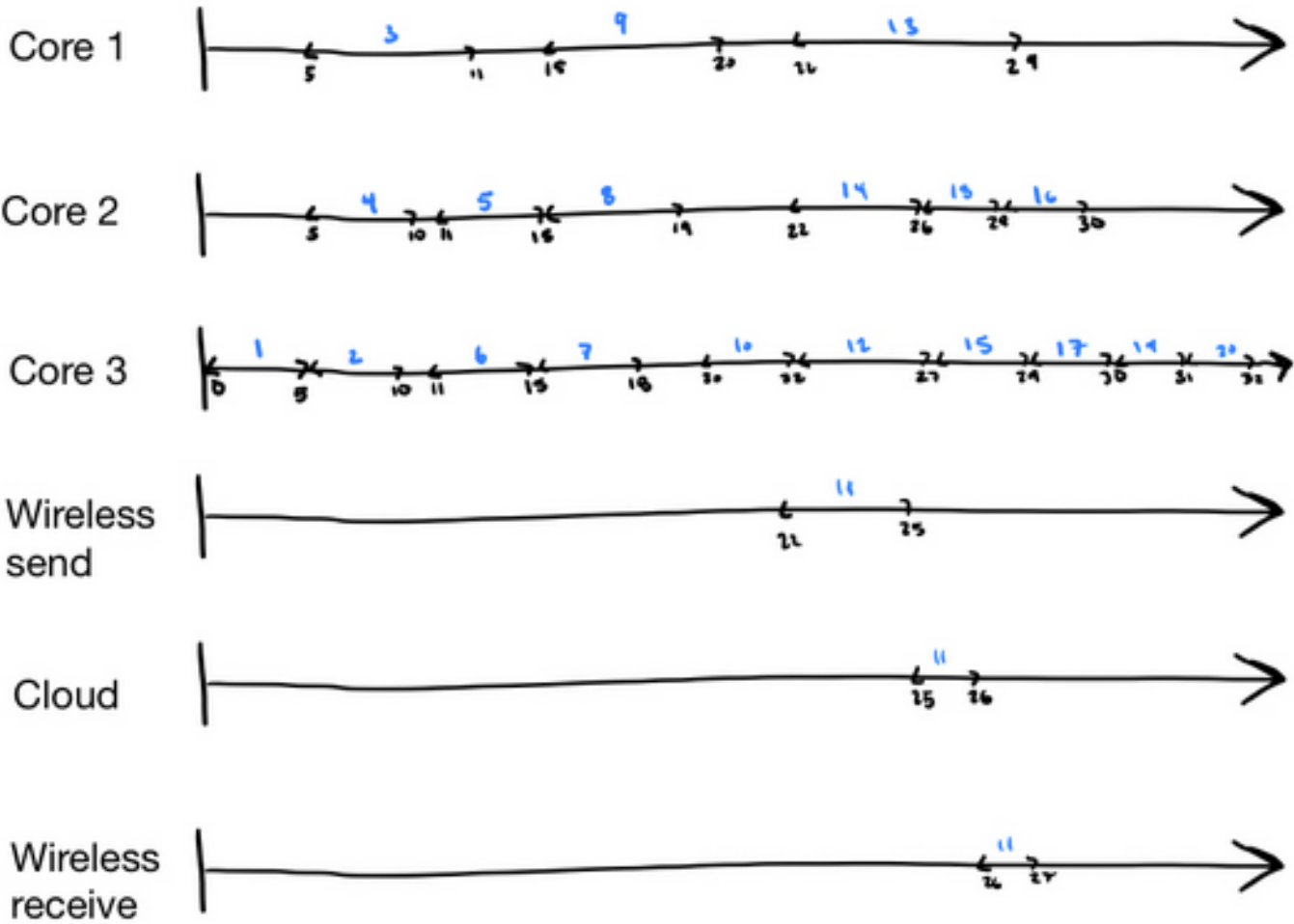


Figure 3.1



Task	Core 1	Core 2	Core 3
1	9	7	5
2	8	6	5
3	6	5	4
4	7	5	3
5	5	4	2
6	7	6	4
7	8	5	3
8	6	4	2
9	5	3	2
10	7	4	2
11	20	19	17
12	8	6	5
13	7	5	2
14	6	4	2
15	5	3	2
16	4	2	1
17	3	2	1
18	9	2	1
19	4	5	1
20	3	2	1

TEST CASE 3

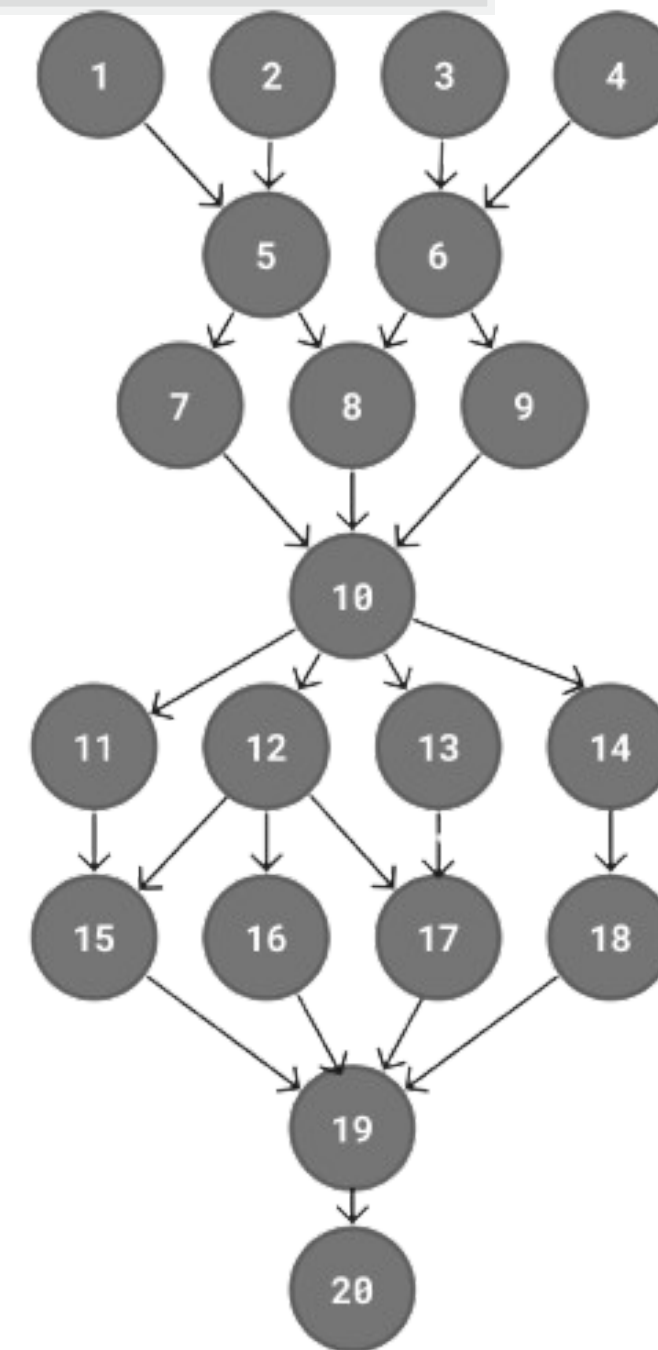
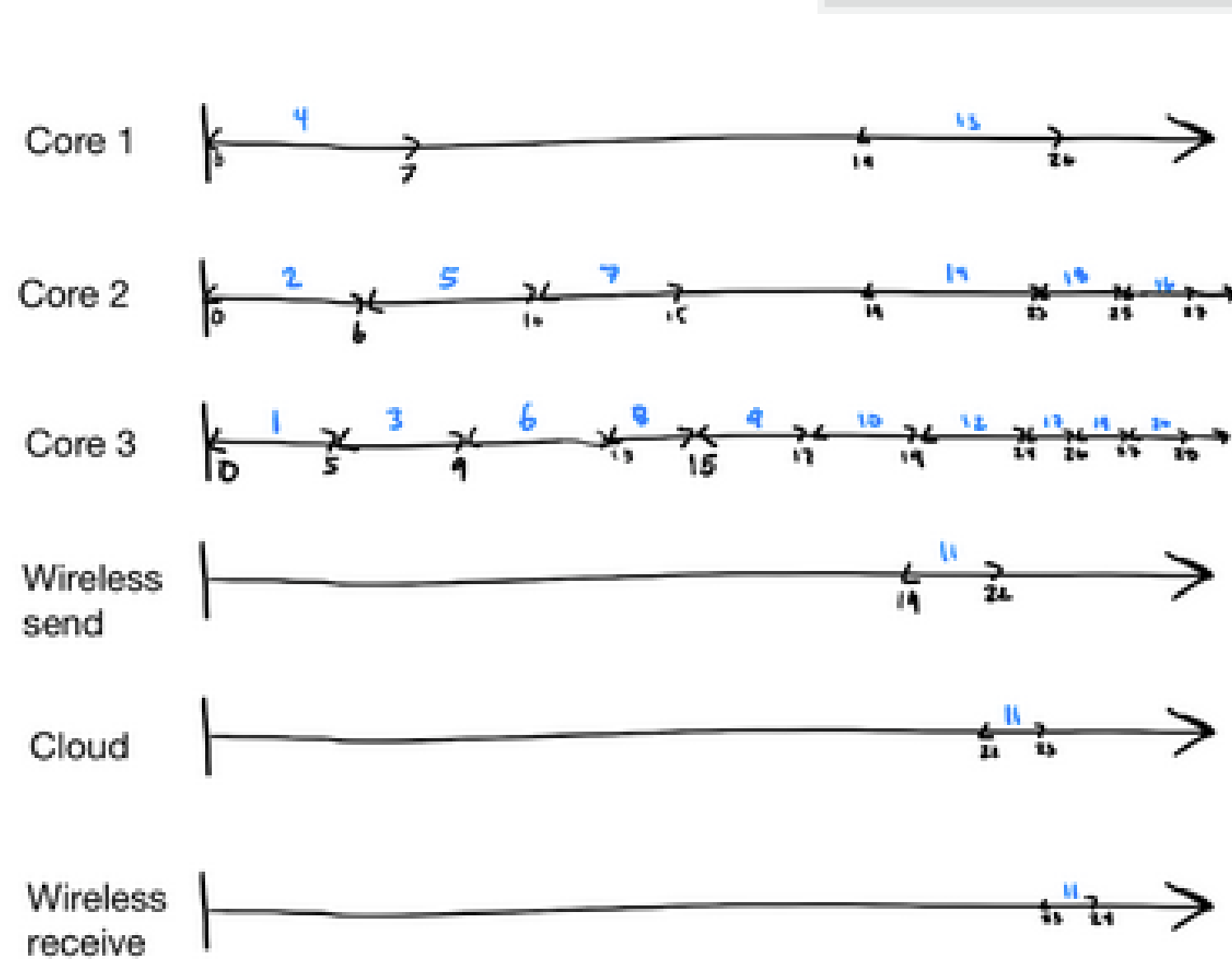


Initial Time	Final Time	Initial Energy	Final Energy
32	32	177.5	177.5

Task	Core 1	Core 2	Core 3
1	9	7	5
2	8	6	5
3	6	5	4
4	7	5	3
5	5	4	2
6	7	6	4
7	8	5	3
8	6	4	2
9	5	3	2
10	7	4	2
11	20	19	17
12	8	6	5
13	7	5	2
14	6	4	2
15	5	3	2
16	4	2	1
17	3	2	1
18	9	2	1
19	4	5	1
20	3	2	1

TEST CASE 4

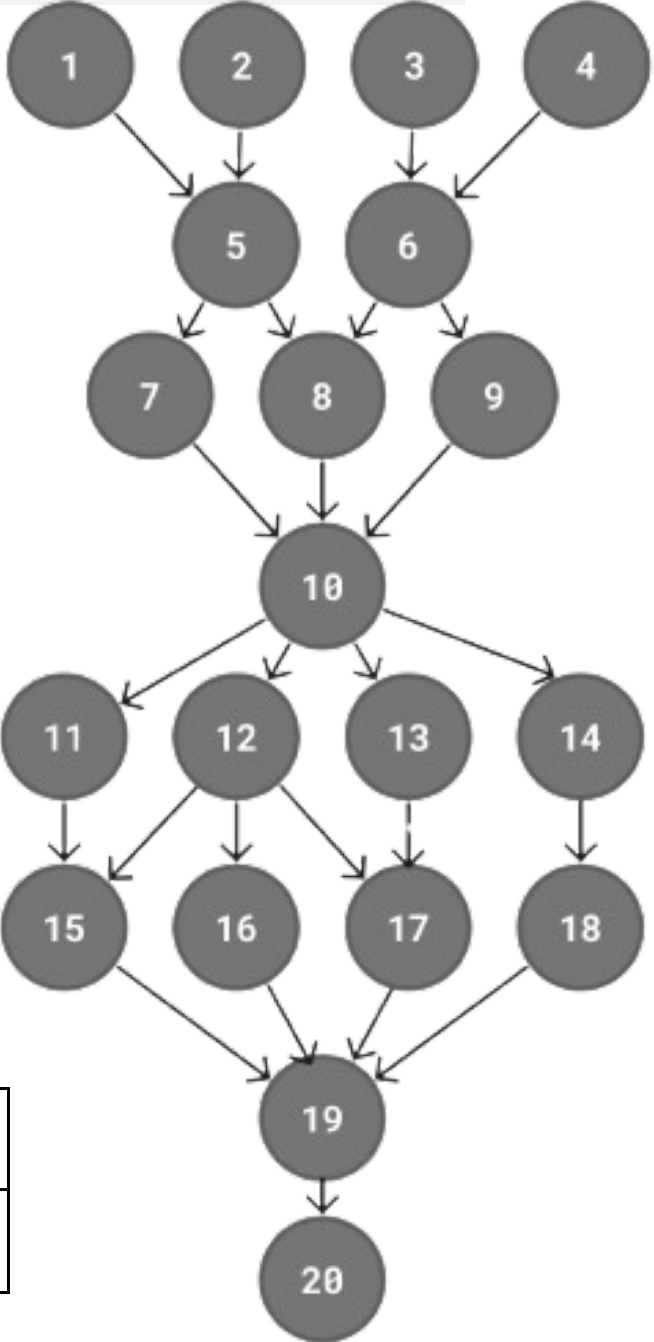
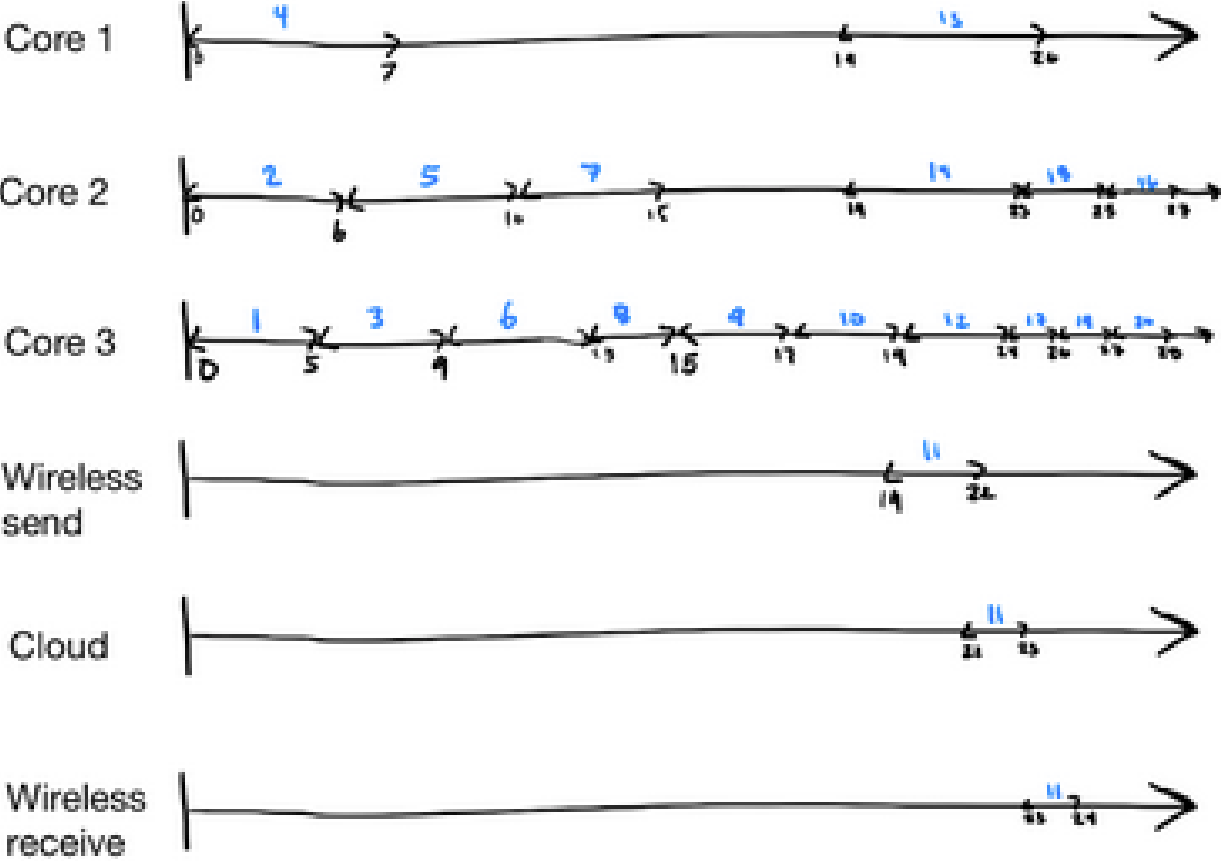
Figure 4.1



Task	Core 1	Core 2	Core 3
1	9	7	5
2	8	6	5
3	6	5	4
4	7	5	3
5	5	4	2
6	7	6	4
7	8	5	3
8	6	4	2
9	5	3	2
10	7	4	2
11	20	19	17
12	8	6	5
13	7	5	2
14	6	4	2
15	5	3	2
16	4	2	1
17	3	2	1
18	9	2	1
19	4	5	1
20	3	2	1

TEST CASE 4

Figure 4.1

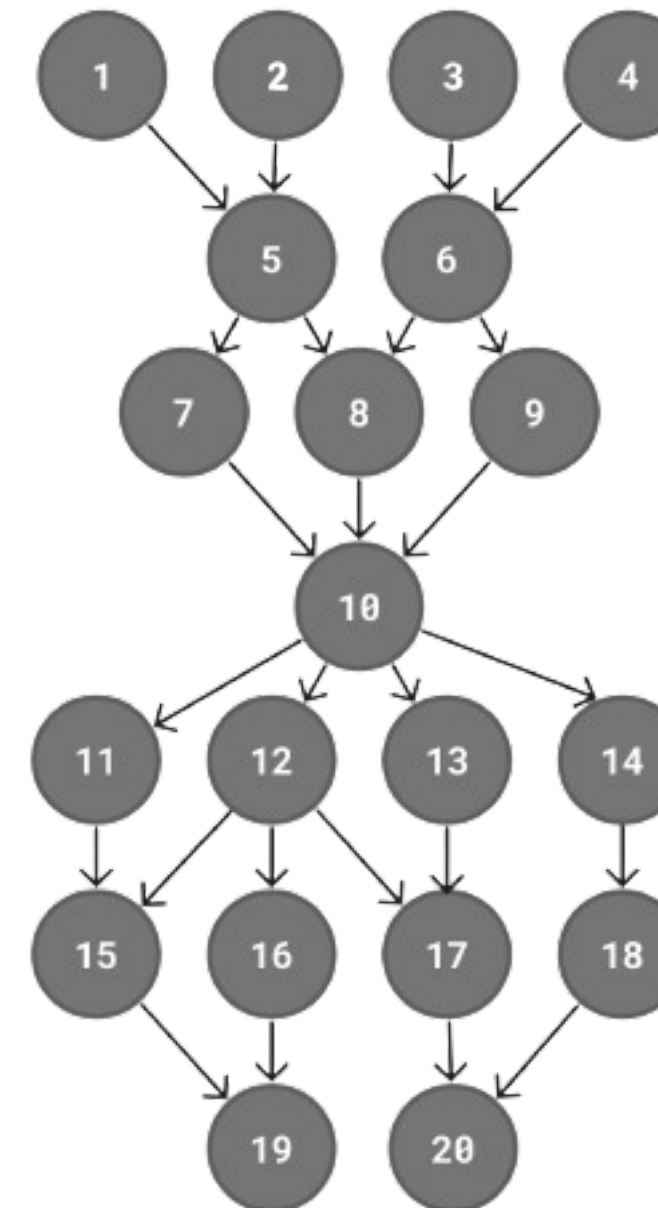
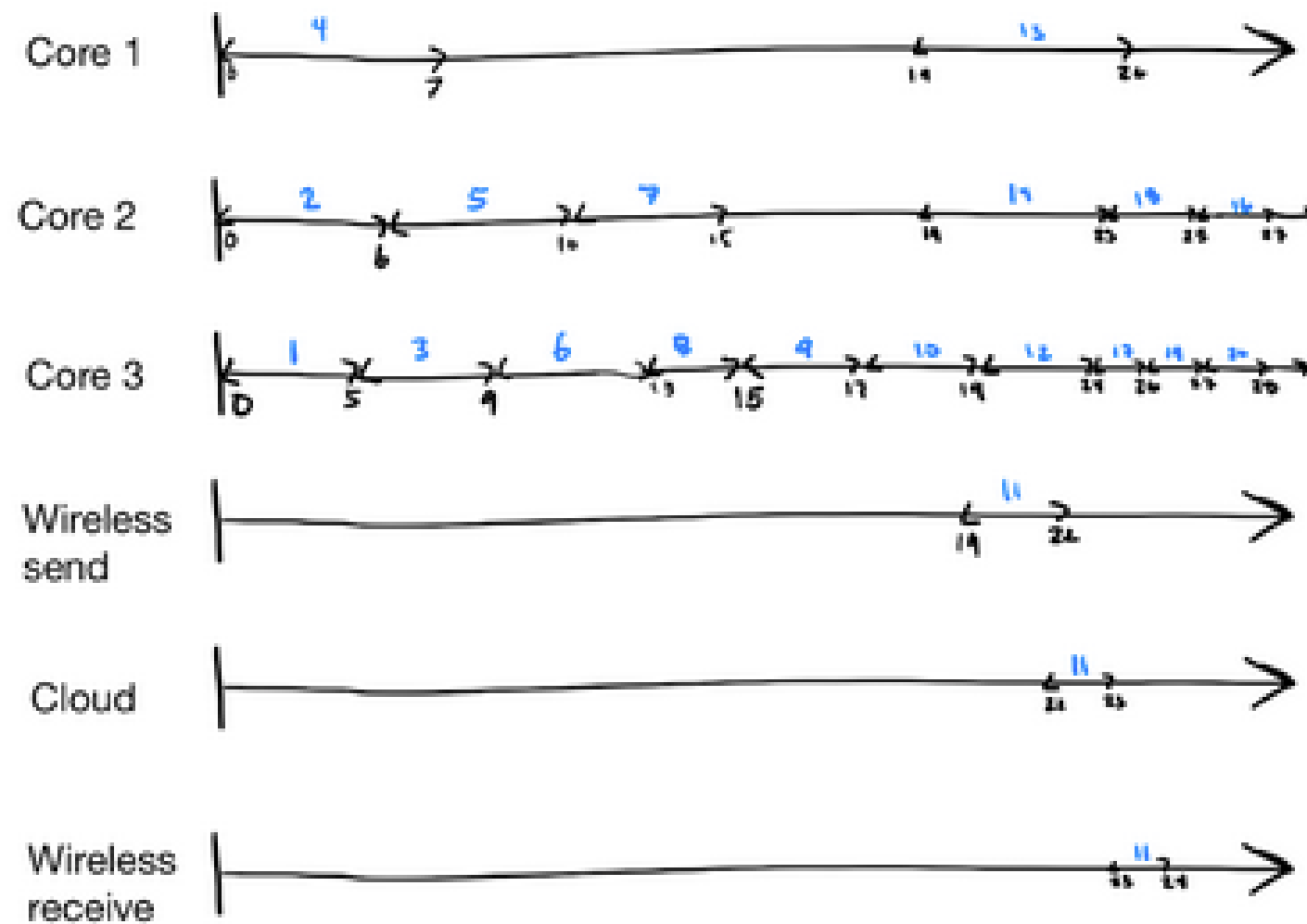


Task	Core 1	Core 2	Core 3
1	9	7	5
2	8	6	5
3	6	5	4
4	7	5	3
5	5	4	2
6	7	6	4
7	8	5	3
8	6	4	2
9	5	3	2
10	7	4	2
11	20	19	17
12	8	6	5
13	7	5	2
14	6	4	2
15	5	3	2
16	4	2	1
17	3	2	1
18	9	2	1
19	4	5	1
20	3	2	1

Initial Time	Final Time	Initial Energy	Final Energy
29	29	177.5	177.5

TEST CASE 5

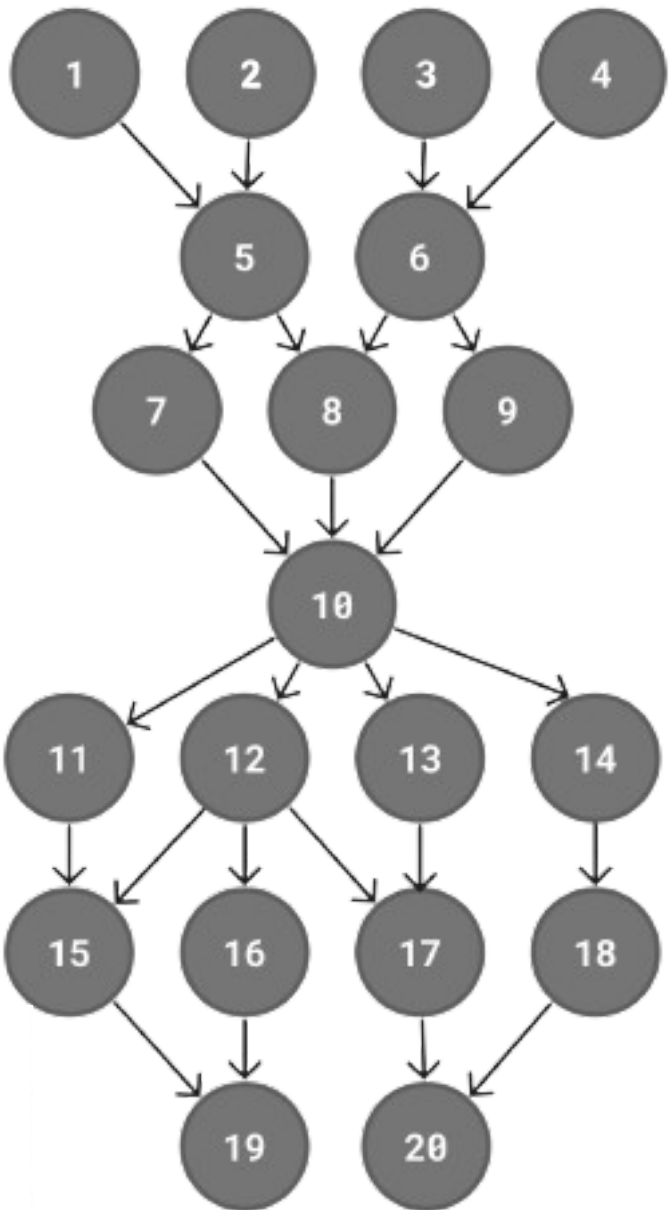
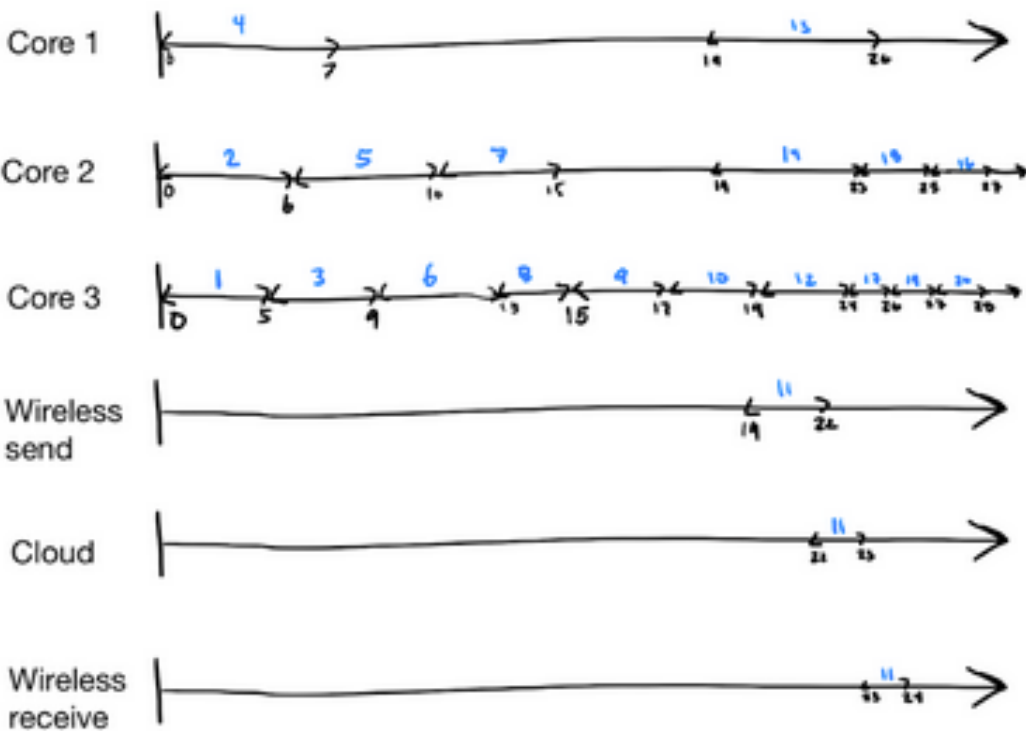
Figure 5.1



Task	Core 1	Core 2	Core 3
1	9	7	5
2	8	6	5
3	6	5	4
4	7	5	3
5	5	4	2
6	7	6	4
7	8	5	3
8	6	4	2
9	5	3	2
10	7	4	2
11	20	19	17
12	8	6	5
13	7	5	2
14	6	4	2
15	5	3	2
16	4	2	1
17	3	2	1
18	9	2	1
19	4	5	1
20	3	2	1

TEST CASE 5

Figure 5.1



Task	Core 1	Core 2	Core 3
1	9	7	5
2	8	6	5
3	6	5	4
4	7	5	3
5	5	4	2
6	7	6	4
7	8	5	3
8	6	4	2
9	5	3	2
10	7	4	2
11	20	19	17
12	8	6	5
13	7	5	2
14	6	4	2
15	5	3	2
16	4	2	1
17	3	2	1
18	9	2	1
19	4	5	1
20	3	2	1

Initial Time	Final Time	Initial Energy	Final Energy
29	29	177.5	177.5



REFERENCES

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Xue Lin, Associate Professor, Dept. of Electrical & Computer Engineering
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- 🔍 **ENERGY AND PERFORMANCE-AWARE TASK SCHEDULING IN A MOBILE CLOUD COMPUTING ENVIRONMENT**
Xue Lin, Yanzhi Wang, Qing Xie, Massoud Pedram