Chapter V: Information System Planning

1. Introduction

Nowadays, Information Systems plays the main role in success or failure of a business organization. When Information Systems are integrated well in the organization, it is likely that the Organization gain a lot of benefits and therefore it will be alive in the competitive environment. To have well-integrated Information Systems, the Information System plan has to be conducted. The planning must identify resources, schedule, and activities required to develop an information system that response to the needs of the organization.

Chapter V: Information System Planning

2. Reasons for a new information system

There are a number of reasons that an organization need to acquire a new information system. The reasons are internal and external.

-Business growth

One need for the new information system is within the organization itself. When the growth of the organization is beyond the current system, the new information system that provides more capacity for the business needs is required.

Chapter V: Information System Planning

-Increased competition

When the competition among the business organizations are high, your organization must find the better information system that the organization can gain competitive advantages from. The new innovative technology can provide costs reduction in business operations, improve information management, and provide better customer services. These advantages are crucial for the organization in competitive markets.

Chapter V: Information System Planning

3. Factors that affect information system

When an information system is implemented in an organization, it can be successful or failed. There are a number of factors that drive the information system to the success or failure. These factors can come from external environment and internal structure of the organization, IS project team, and the use of appropriate technology and methodology.

Chapter V: Information System Planning

3. Factors that affect information system

-External environment factors:

While the external environment is changing, it always requires the organization to adjust its information systems or to implement new information system in order to survive. If the information systems are integrated well in in the whole system of the organization, they will support strategic goal of the organization. So the information systems are successful.

Chapter V: Information System Planning

3. Factors that affect information system

-Internal structure factors:

Internal structure of the organization also has a strong relationship with information systems that it is using. Successful information systems must support the needs and goals of all levels of the organization, and receive enough commitment from management. The organization also needs technical staff that are able to carry out or implement IS projects.

Chapter V: Information System Planning

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Internal structure of the organization also has a strong relationship with information systems that it is using. Successful information systems must support the needs and goals of all levels of the organization, and receive enough commitment from management. The organization also needs technical staff that are able to carry out or implement IS projects. The end-users need to be well trained to use the IS and clearly understand the advantages that IS can contribute to the organization, so that the IS fully functions.

Chapter V: Information System Planning

3. Factors that affect information system

-IS project team factors:

The capacities and experience of the IS project team are factors that can not be overlooked. High capacities and experienced project team members, especially the team leader can directly lead to the success of IS project. The team commitment is also a must. Experienced team members must have a strong commitment to the IS project, so the probability that the organization has good quality system is high.

Chapter V: Information System Planning

3. Factors that affect information system

-Appropriate technology factors:

The organization must identify clearly the objectives and scope of its IS project. When the project objectives and scope are well defined, the appropriate technology and methodology can be obtained. The use of appropriate technology and methodology in IS project can lead to the success of the project.

Chapter V: Information System Planning

4. Feasibility Study

When the software scope (data, functions, performance, constraints) is defined, one question to be asked is “Can we develop a software to meet the scope?”. To answer this question, you need to conduct a feasibility study that focuses on the following areas:

-Technical feasibility: Can the current equipment, tools, support the proposed project?

-Financial feasibility: Can the development complete at a cost that the customers or markets can afford? If benefits are more than the cost, the proposed system is OK.

Chapter V: Information System Planning

4. Feasibility Study

-Time feasibility: Can we complete the proposed system in the specified date? The early the software available in the market is critical to the competition?

-Resources feasibility: What new skills will be required? Can the existing staff be trained to support the project?

Chapter V: Information System Planning

5. Project Scheduling Methods

A project is a collection of activities that need to be performed and completed in a minimal time and at a minimal cost. The objectives of the project scheduling are :

-Determining whether the project can be completed in the specified time period,

-Finding the minimum cost schedule to complete the project,

-Effectively utilizing the resources for the project activities, and

Chapter V: Information System Planning

5. Project Scheduling Methods

-Monitoring the project progress.

To achieve these objectives, project manager uses one or a combination of a number of methods or tools. One method that will be presented in this note is **PERT/CPM** (Project Evaluation and Review Technique/Critical Path Method). In the PERT/CMP method, activities, precedence relations are determined and the complete time , and resources of each activity are estimated. Then a Network diagram is drawn to present those activities.

System Analysis & Design

For example, in the ATM project, the activities to be performed can be presented in the table below.

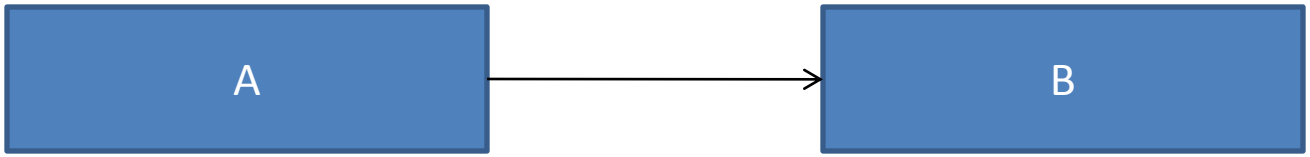
Activity	Description	Duration (week)	Staff needed
A	Feasibility Study	2	2
B	Specify system requirements	4	2
C	Design & code system structure	5	2
D	Test system structure	1	1
E	Design & code system behavior	5	2
F	Test system behavior	1	1
G	Design & code user interfaces	4	2
H	Integrate software components	1	1
I	Training end-users	1	1

System Analysis & Design

From the activities table, we can define the precedence relationships as shown below.

Activity	Predecessor
A	-
B	A
C	B
D	C
E	D
F	E
G	B
H	F, G
I	H

In the Network Diagram, an activity is presented by a rectangle, and the relationship of the activity and its predecessor are presented by an arrow.

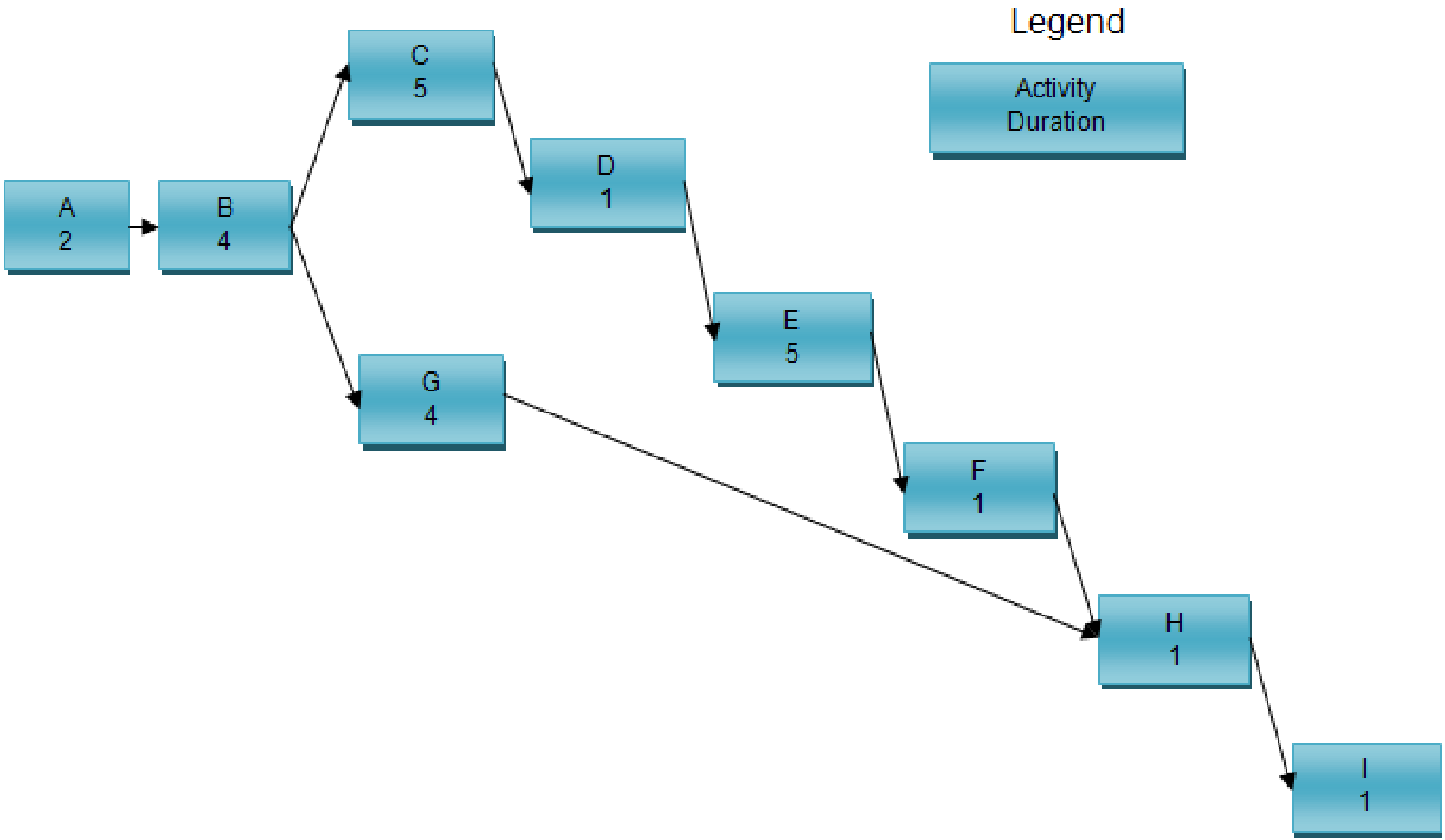


-Activity A is the immediate predecessor of activity B.

-Activity B can not start unless activity A finishes.

-An activity can not start until all its prior activities finish.

Network Diagram of ATM project



Earliest start and Earliest finish times

-The Earliest start time of an activity (ES) is the Earliest time that the activity begins after allowing its predecessors to finish.

-The Earliest finish time (EF) is the Earliest time that the activity finishes after allowing its predecessors to finish.

-To calculate the Earliest start and Earliest finish times of each activity, you will start from the activities that have no predecessors (ES=0, EF=duration). Then move to the activities that their prior activities were evaluated.

Earliest start and Earliest finish times

The ES, and EF of these activities can be calculated as below:

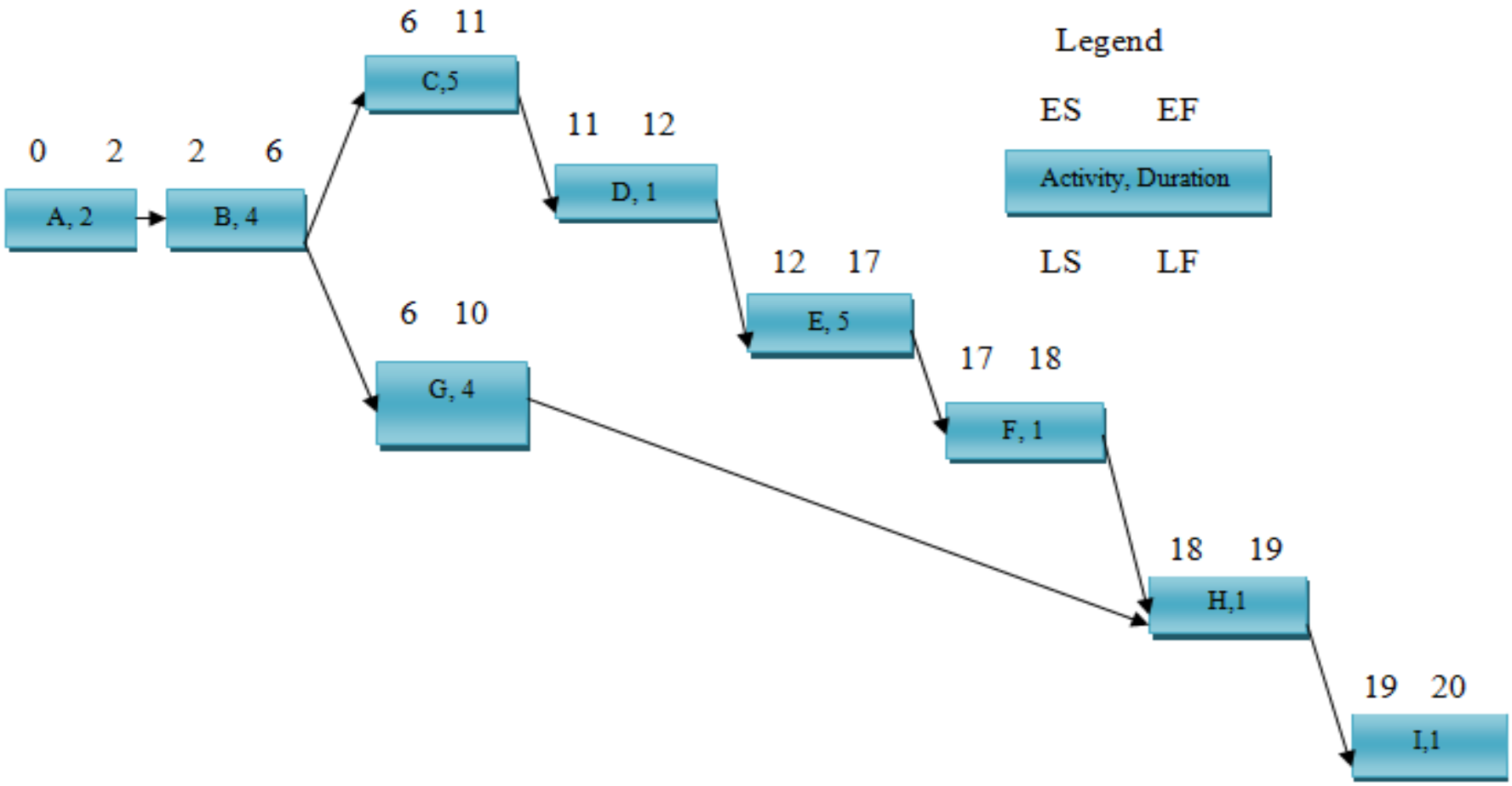
-ES=max EF of all immediate predecessors

-EF=ES+duration

You need to repeat the process until all activities are evaluated.

The Earliest finish time of the last activity is the **earliest or minimal finish time of the project.**

ATM network diagram with Earliest start and Earliest finish times



Latest start and Latest finish times

-The latest start time of an activity (LS) is the latest time that the activity may begin without delaying the project.

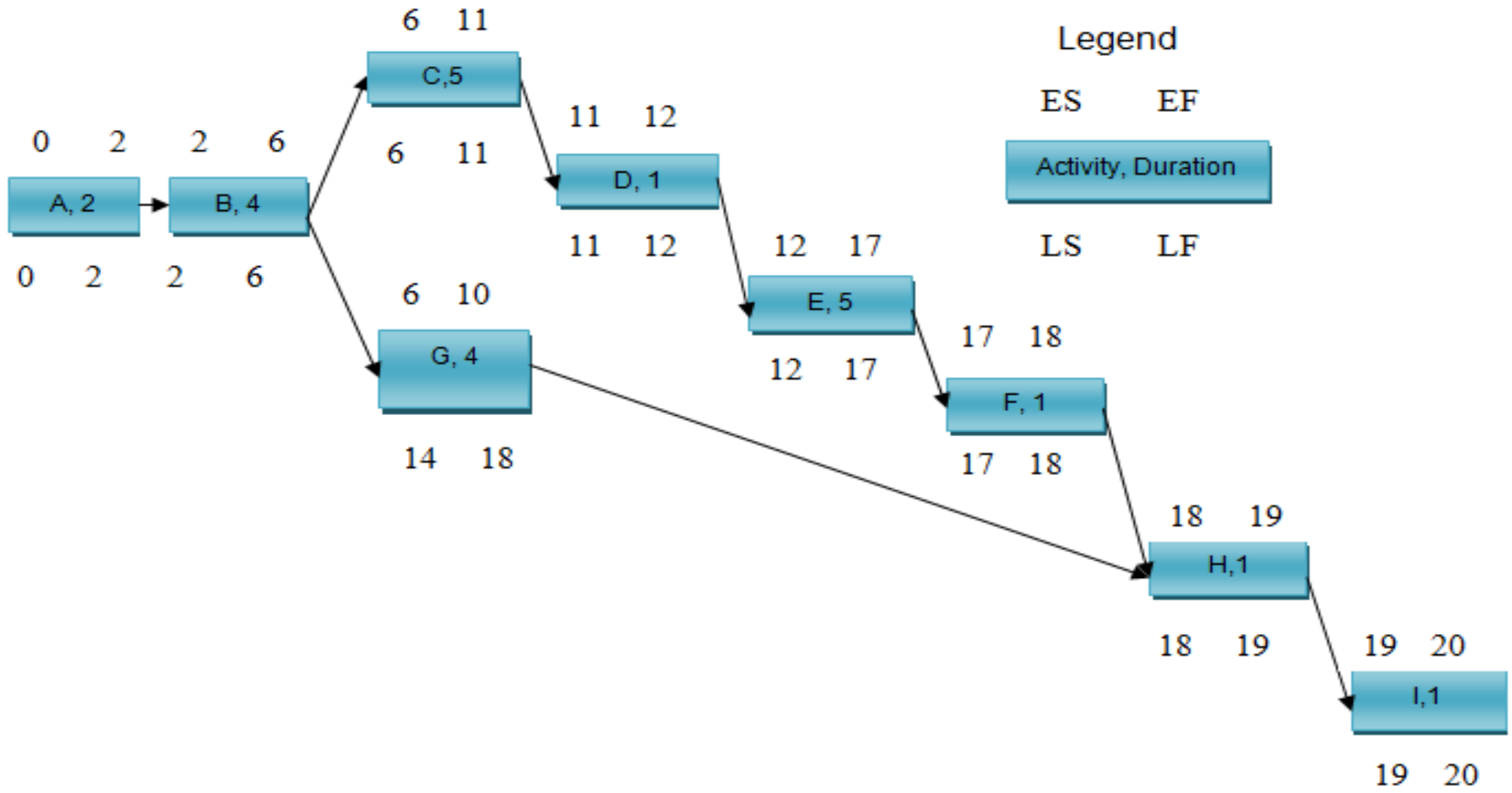
-The latest finish time (LF) is the latest time that the activity may finish without delaying the project.

-To calculate the latest start and latest finish times of each activity, you will work backward, from the end of the project to the beginning.

-LF=min LS of all immediate successors

-LS=LF-duration

ATM network diagram with latest start and latest finish times



Stack times and Critical path

-Slack time is the amount of time that the activity can be delayed.

-The start time and finish time of activities may be delayed because of any reasons.

-Slack time of an activity can be zero. Delaying the activities that have zero slack time will delay the project complete date.

-An activity that has zero slack time is called **critical activity**.

Stack times and Critical path

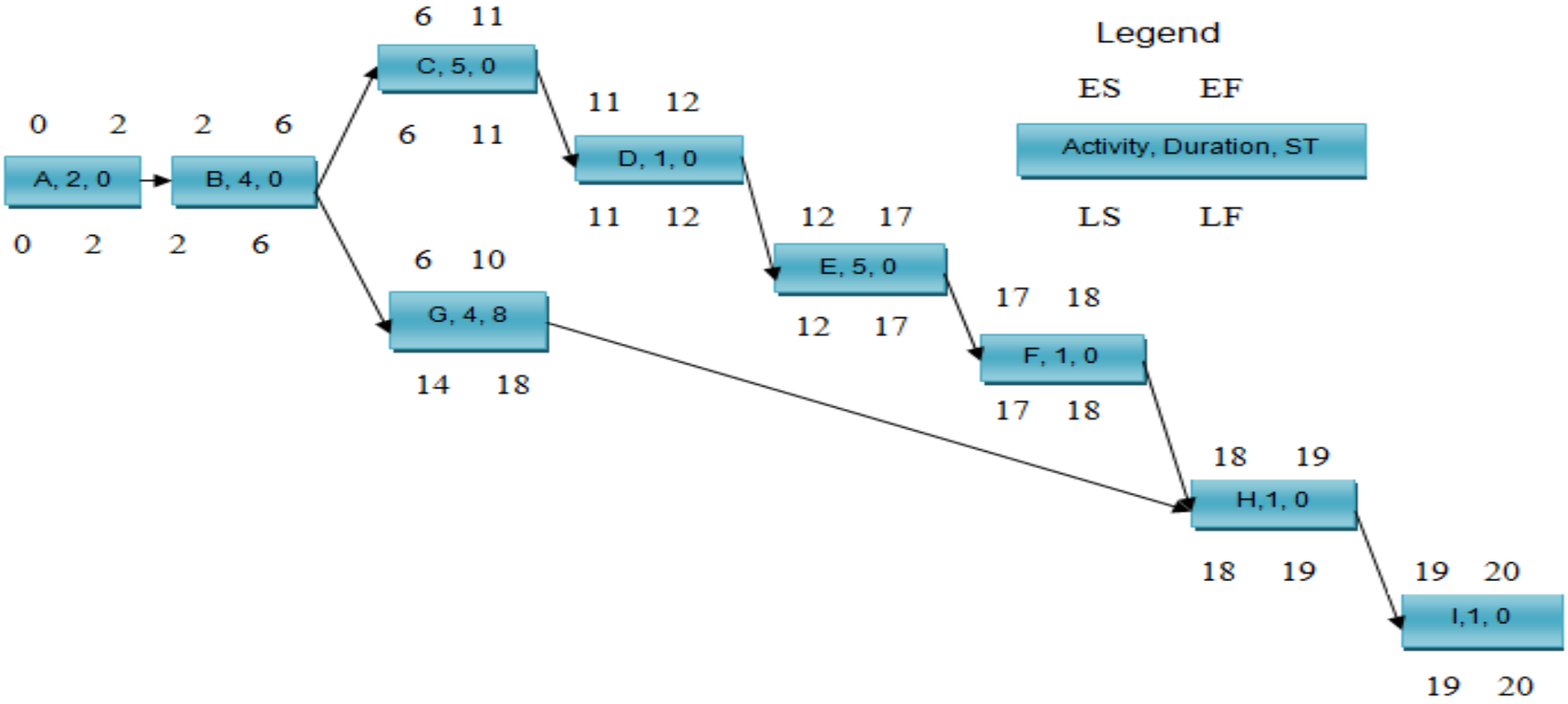
-**Critical path is** longest path in the Network Diagram. It contains all critical activities.

-The sum of all durations of activities on the critical path is the minimal project completion time.

-The slack time of an activity can be calculated as shown below:

ST=LS-ES=LF-EF

ATM network diagram with slack times, and critical path



Critical Path=A-B-C-D-E-F-H-I=minimal project completion time

Resource constraints

-Some projects may face resources constraints.

-This is true for a project in which some of its activities start in parallel. For example, in ATM project, activity C and G can start in parallel. Starting the two activities in parallel need 4 staff. However, only 3 staff are available.

-To satisfy the resource constraints, the project duration will be delayed.

-To schedule activities of a resource-constraints project, the **parallel method** that focuses on three priorities can be applied.

Resource constraints

+Minimum stack

+Smallest duration

+Lowest identification number

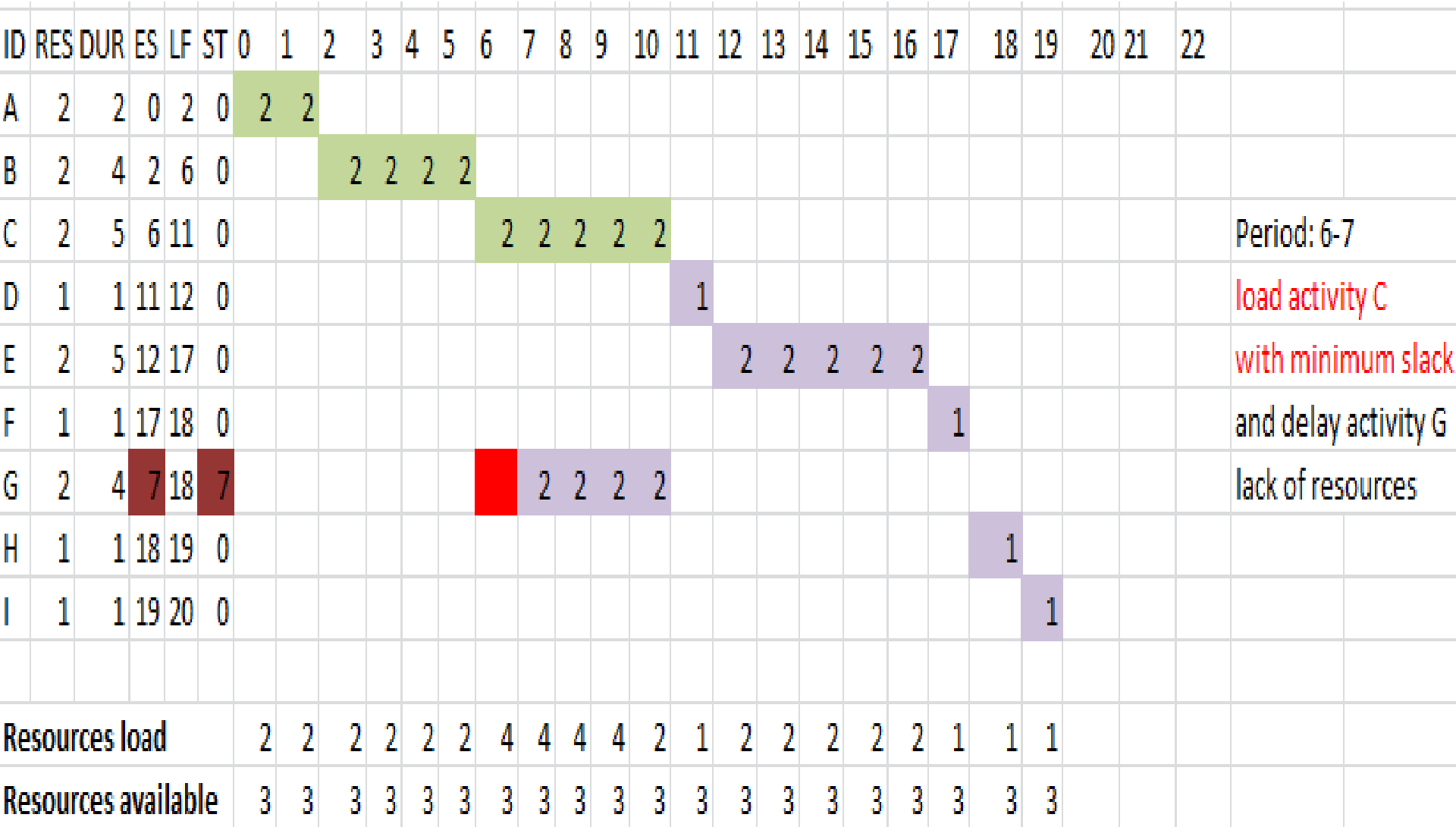
The steps below show will help you to reschedule the project that has resource constrains.

Resource constraints

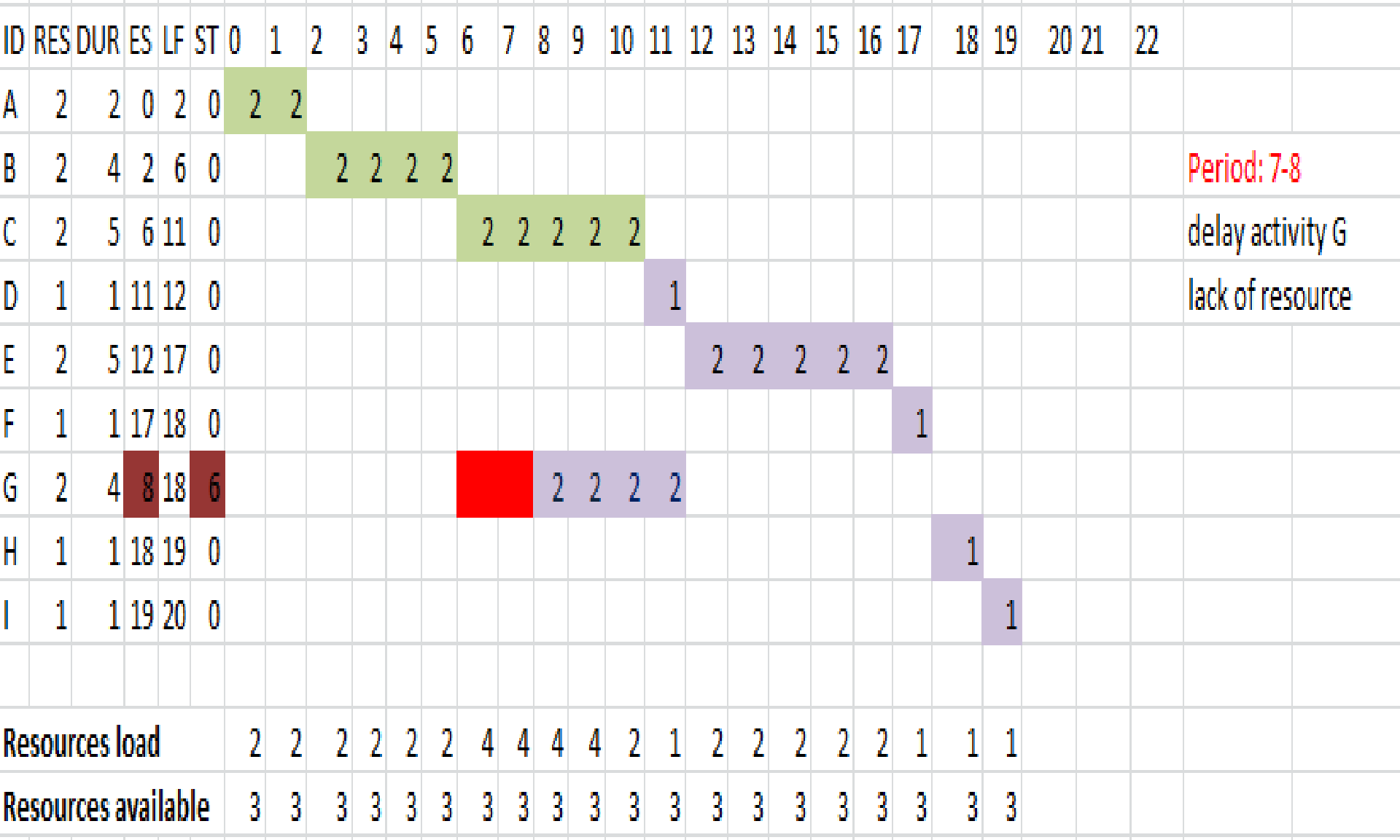
Step 1. Draw Resource Load Chart

ID	RES	DUR	ES	LF	ST	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
A	2	2	0	2	0	2	2																					
B	2	4	2	6	0			2	2	2	2																	
C	2	5	6	11	0							2	2	2	2	2												
D	1	1	11	12	0												1											
E	2	5	12	17	0													2	2	2	2	2						
F	1	1	17	18	0																		1					
G	2	4	6	18	8							2	2	2	2													
H	1	1	18	19	0																			1				
I	1	1	19	20	0																				1			
Resources load						2	2	2	2	2	2	4	4	4	4	2	1	2	2	2	2	2	1	1	1			
Resources available						3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3			

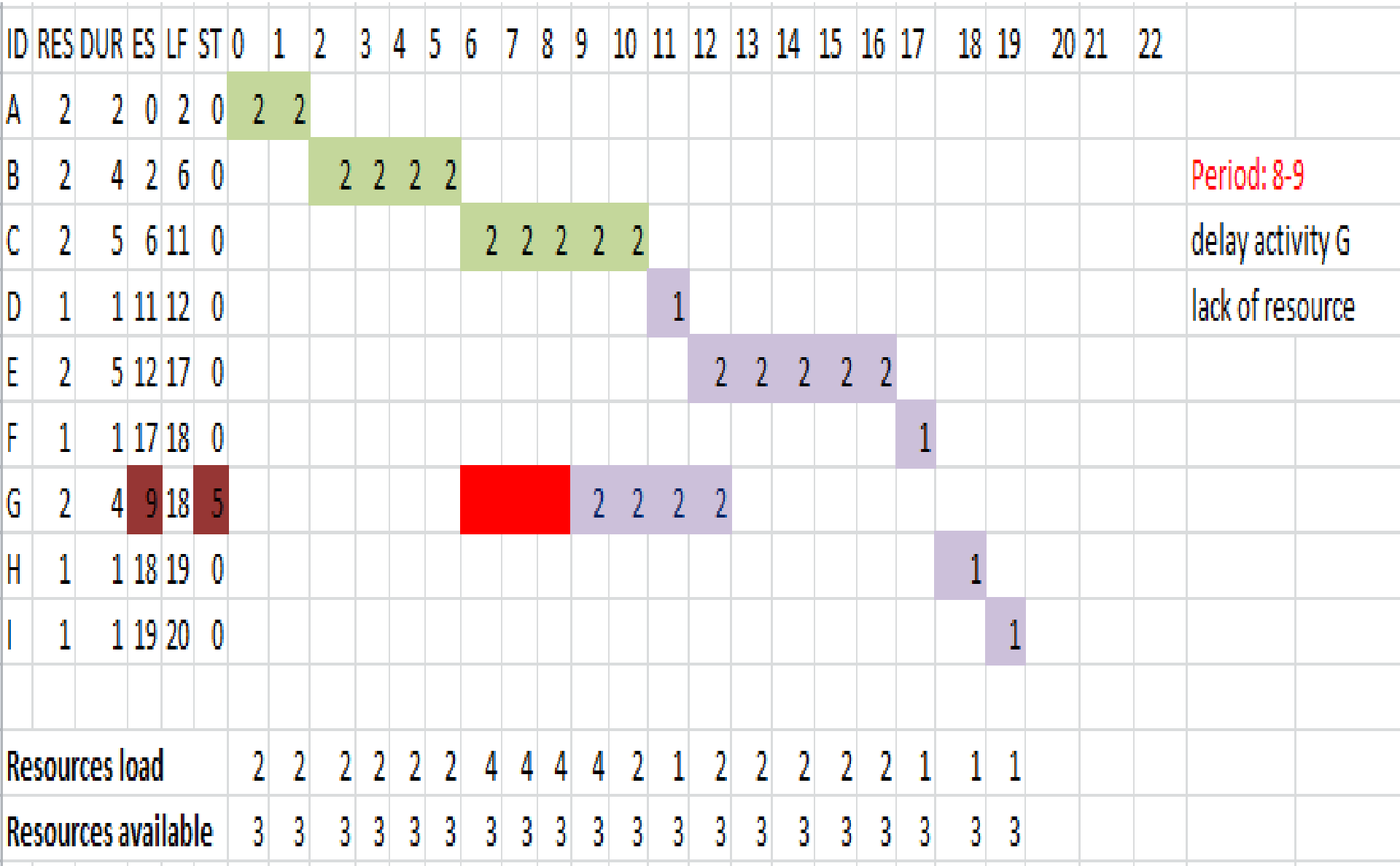
Step 2. Find problematic activity that has minimum slack: load activity C



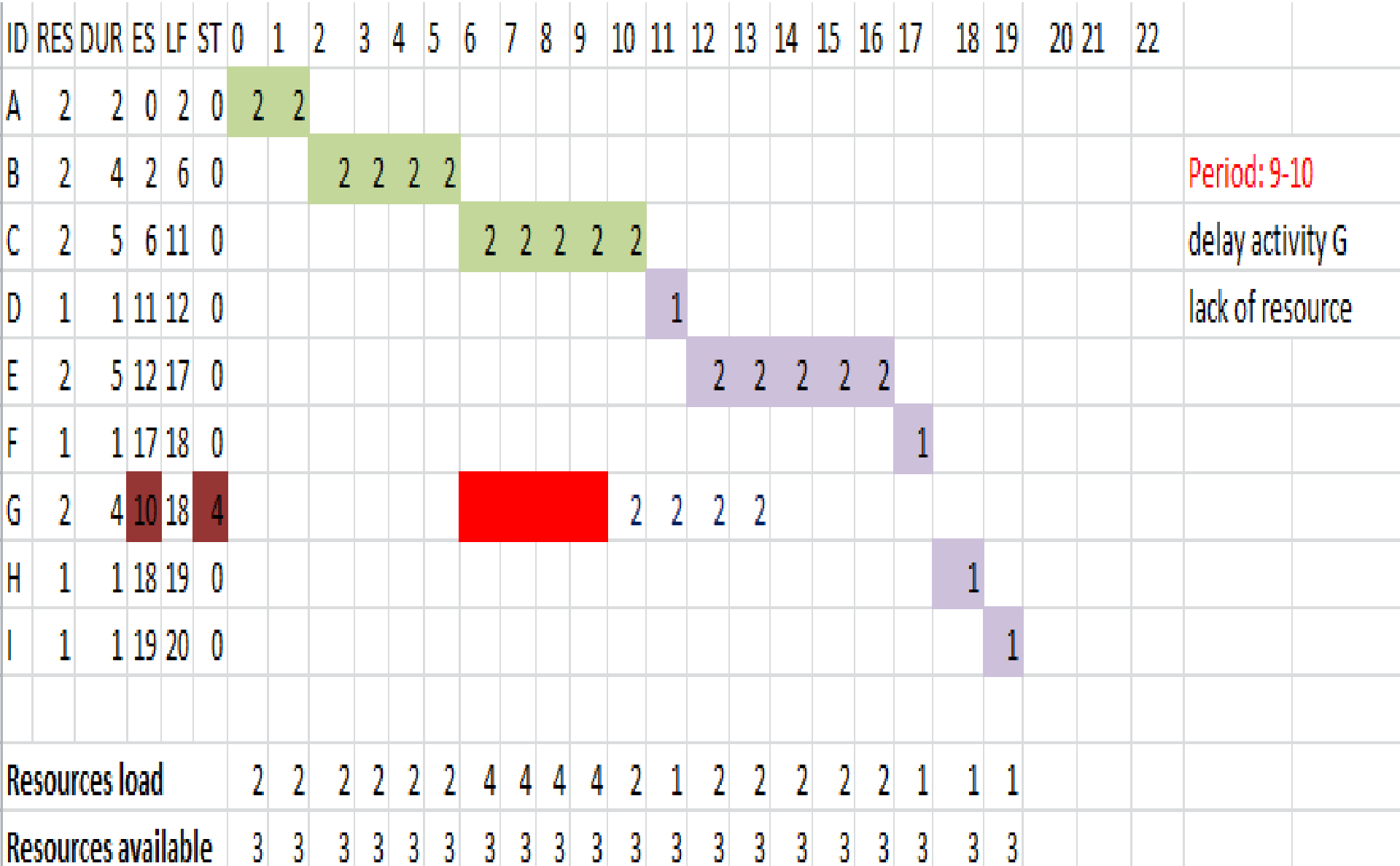
Step 3. move to period: 7-8



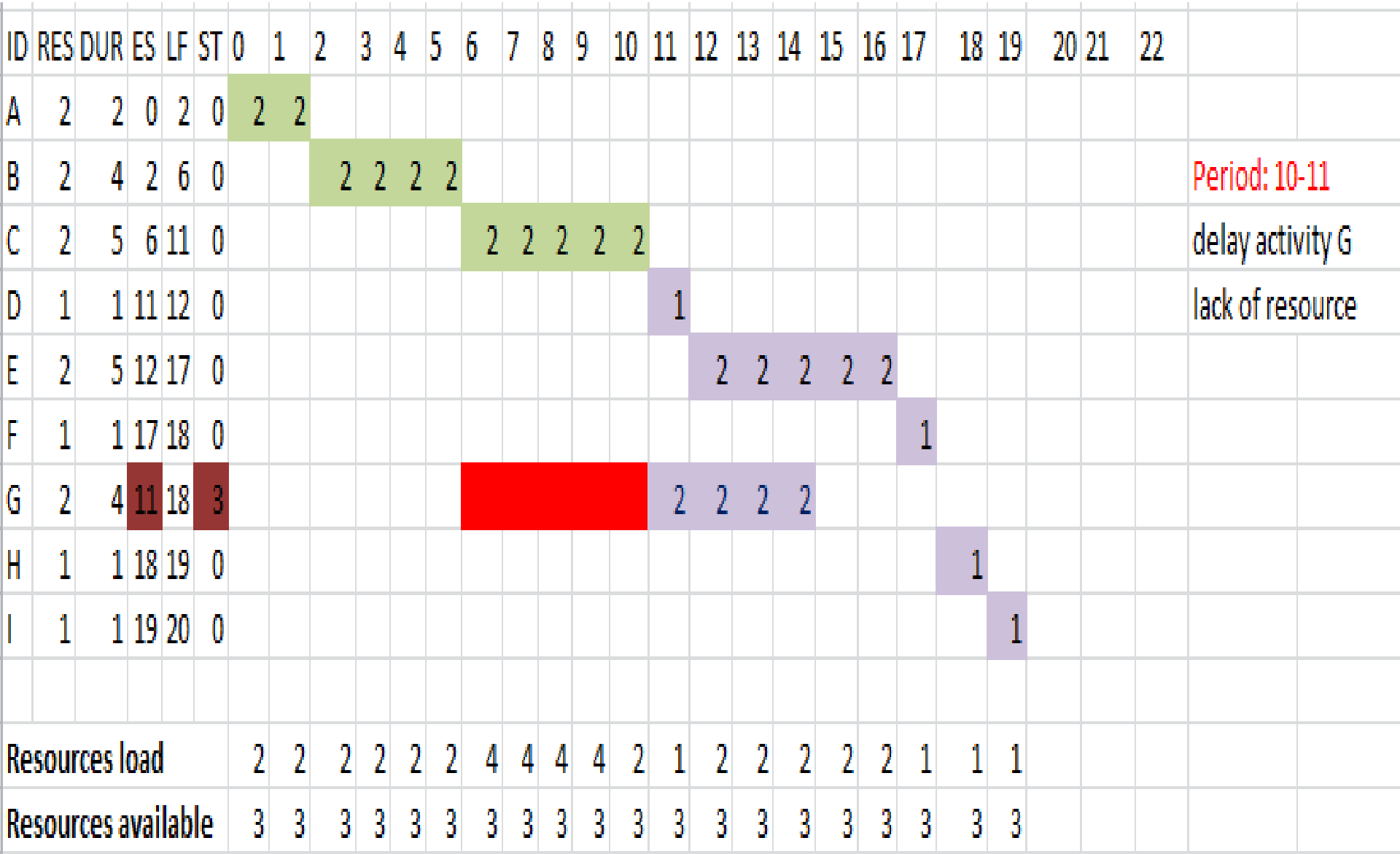
Step 4. move to period: 8-9



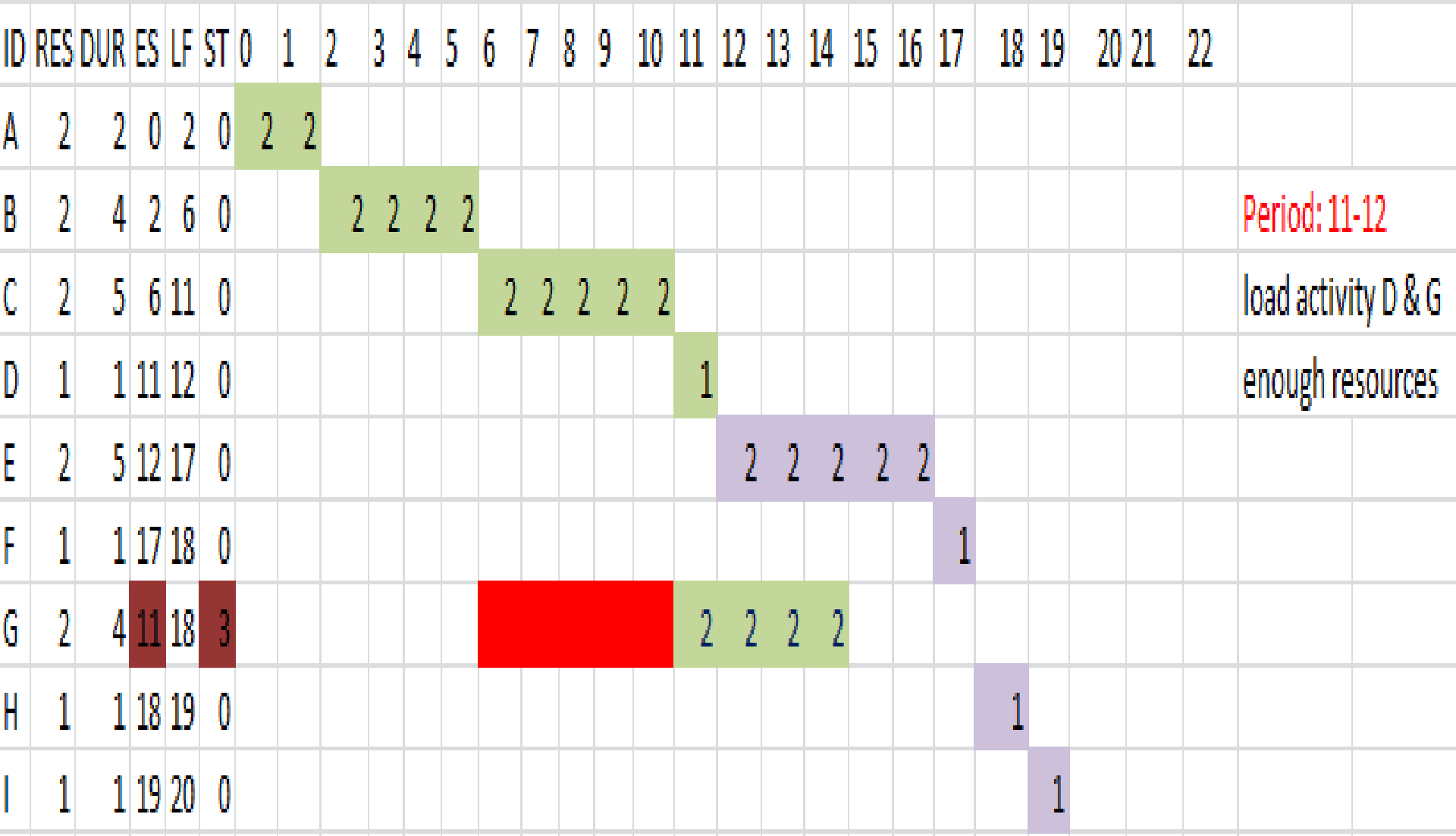
Step 4. move to period: 9-10



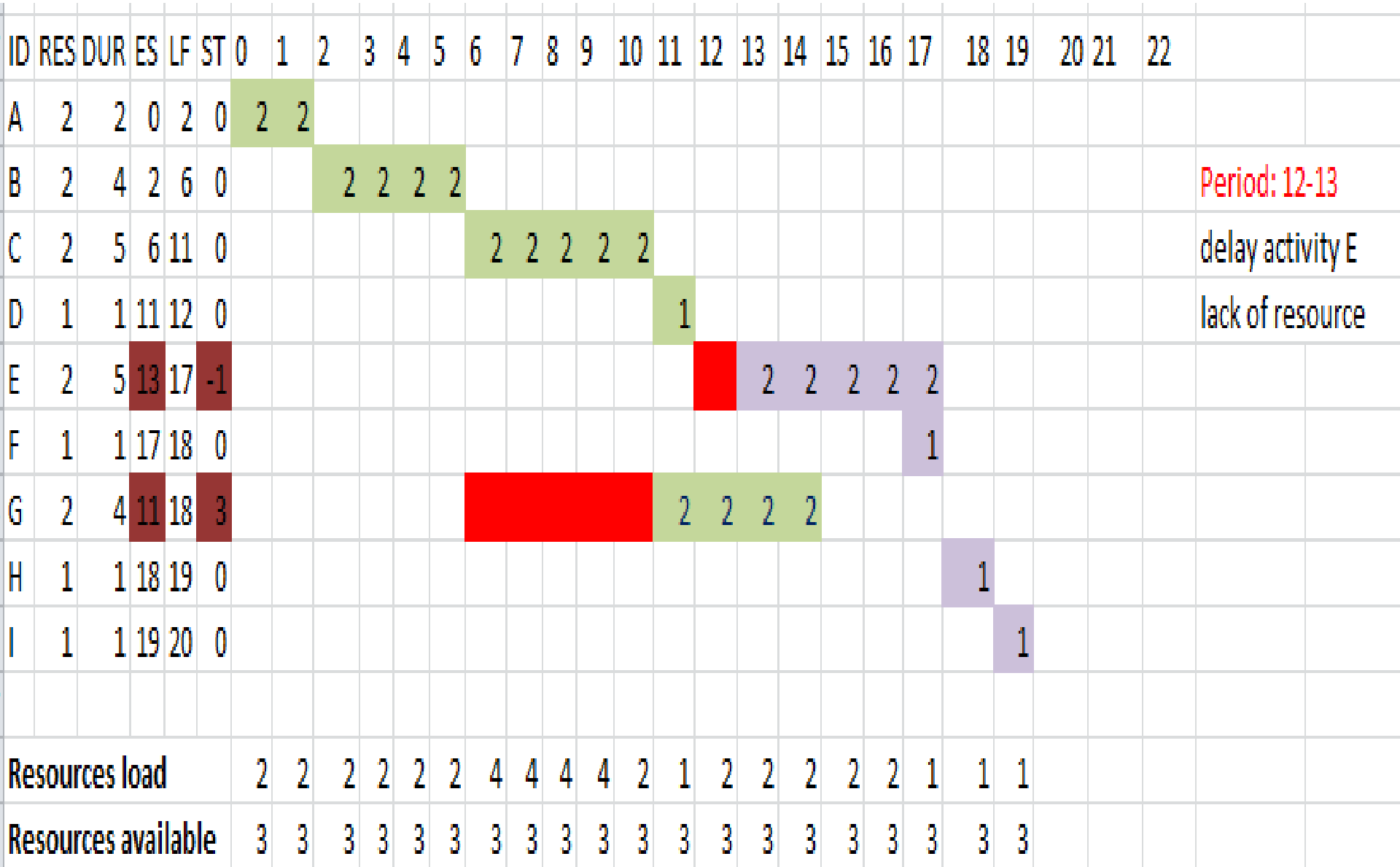
Step 4. move to period: 10-11



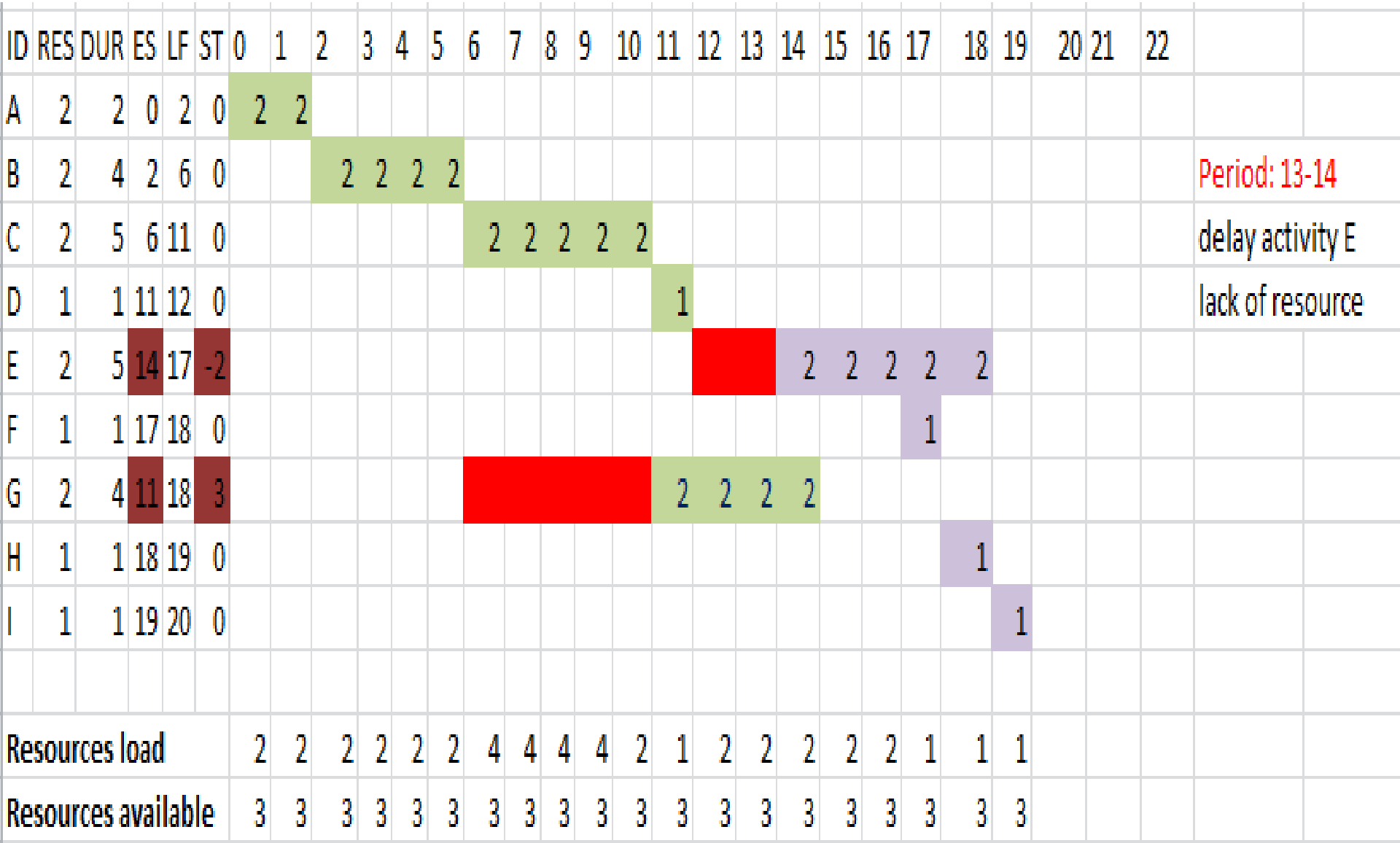
Step 4. move to period: 11-12



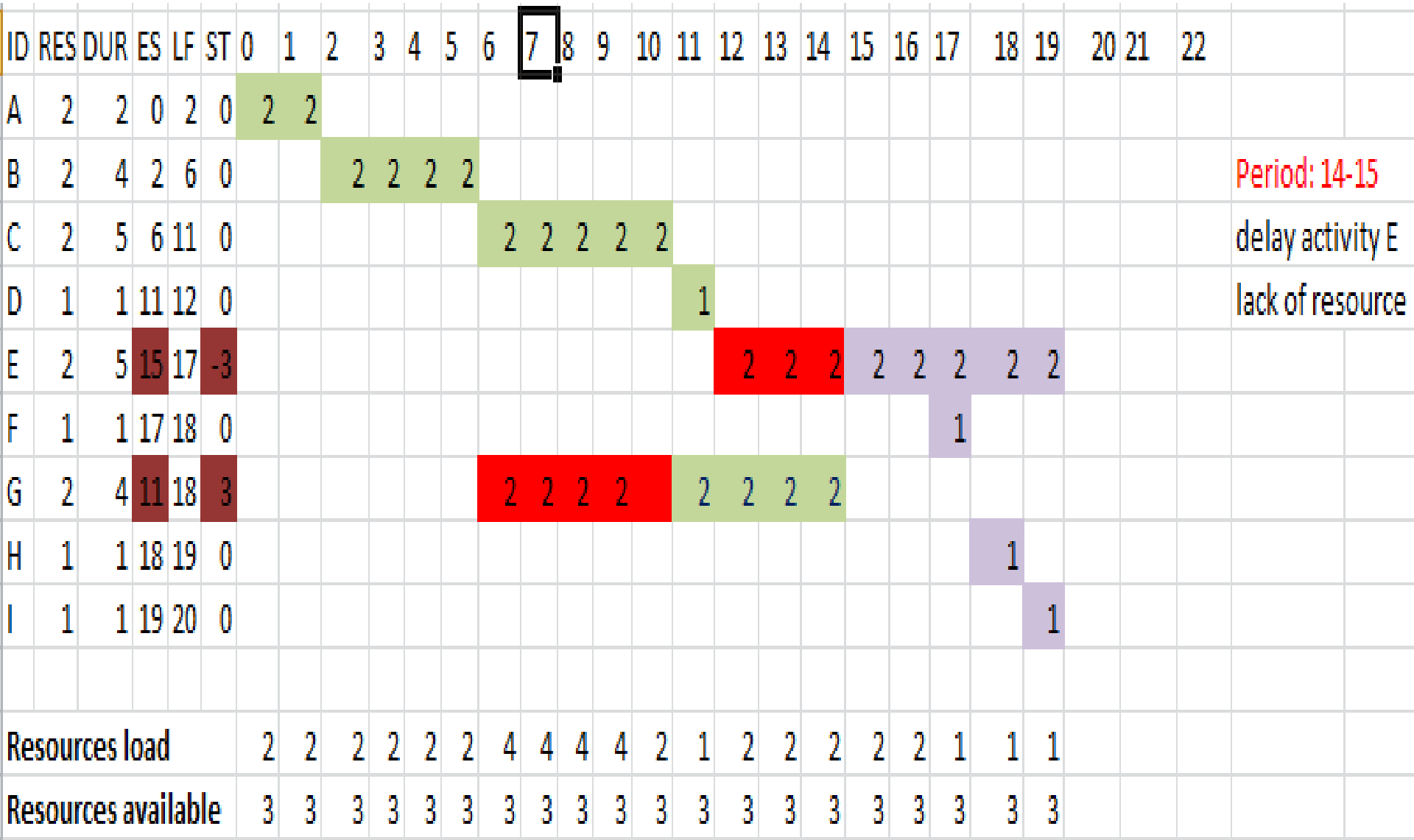
Step 4. move to period: 12-13



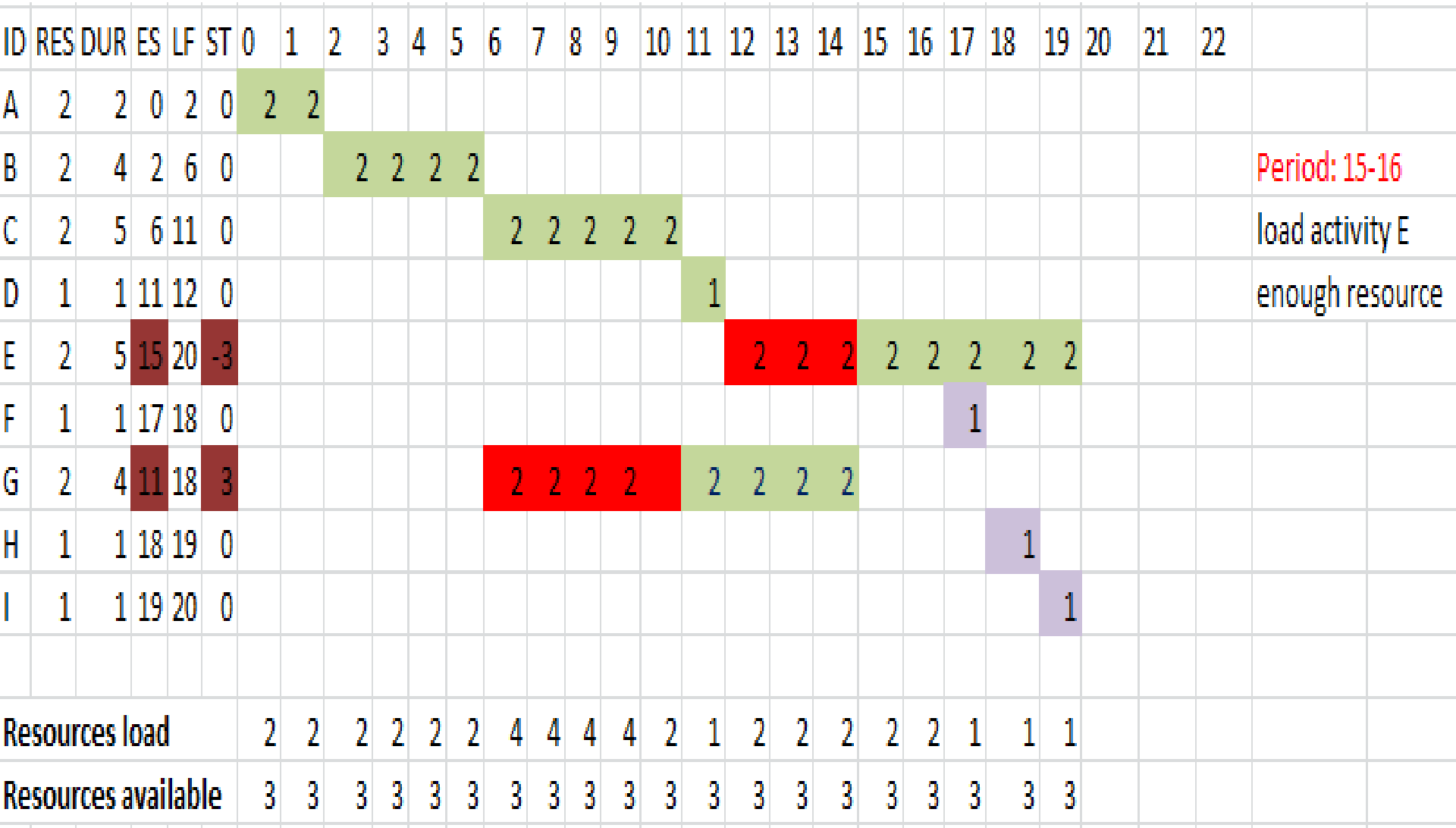
Step 4. move to period: 13-14



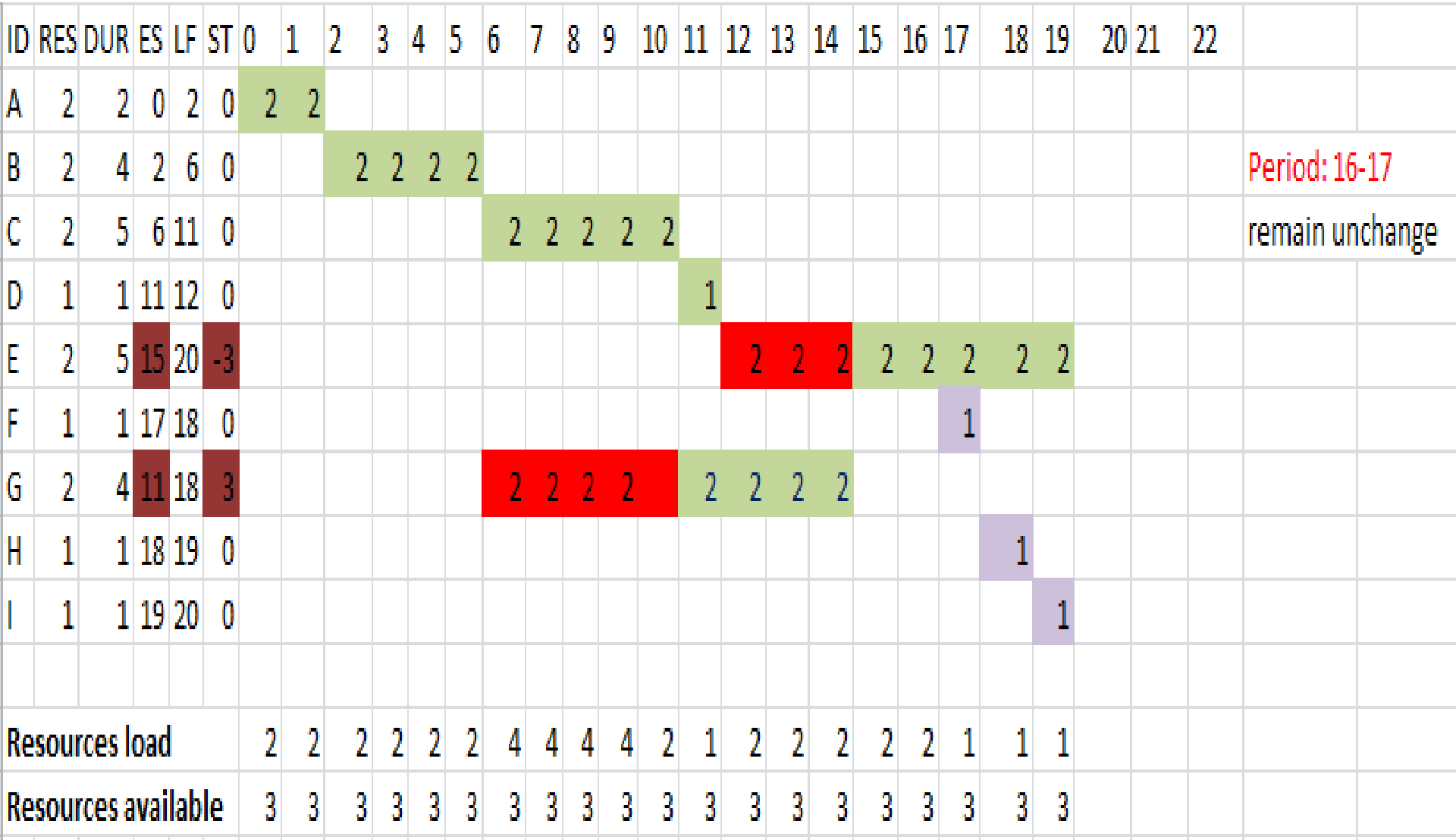
Step 4. move to period: 14-15



Step 4. move to period: 15-16



Step 4. move to period: 16-17

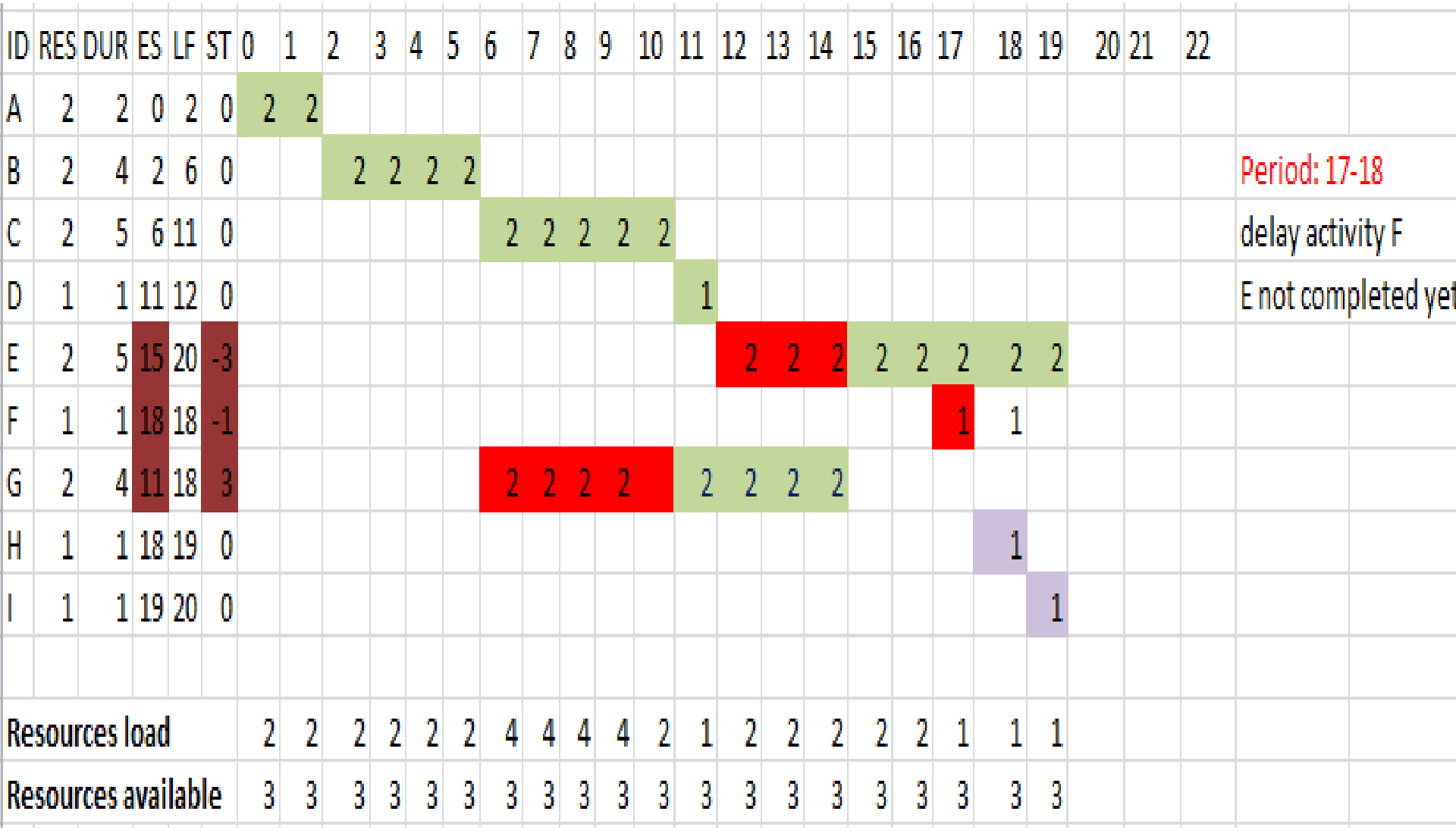


ID	RES	DUR	ES	LF	ST	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
A	2	2	0	2	0	2	2																					
B	2	4	2	6	0			2	2	2	2																	
C	2	5	6	11	0							2	2	2	2	2												
D	1	1	11	12	0												1											
E	2	5	15	20	-3													2	2	2	2	2	2	2	2			
F	1	1	17	18	0																		1					
G	2	4	11	18	3							2	2	2	2		2	2	2	2								
H	1	1	18	19	0																			1				
I	1	1	19	20	0																				1			
Resources load						2	2	2	2	2	2	4	4	4	4	2	1	2	2	2	2	2	1	1	1			
Resources available						3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3			

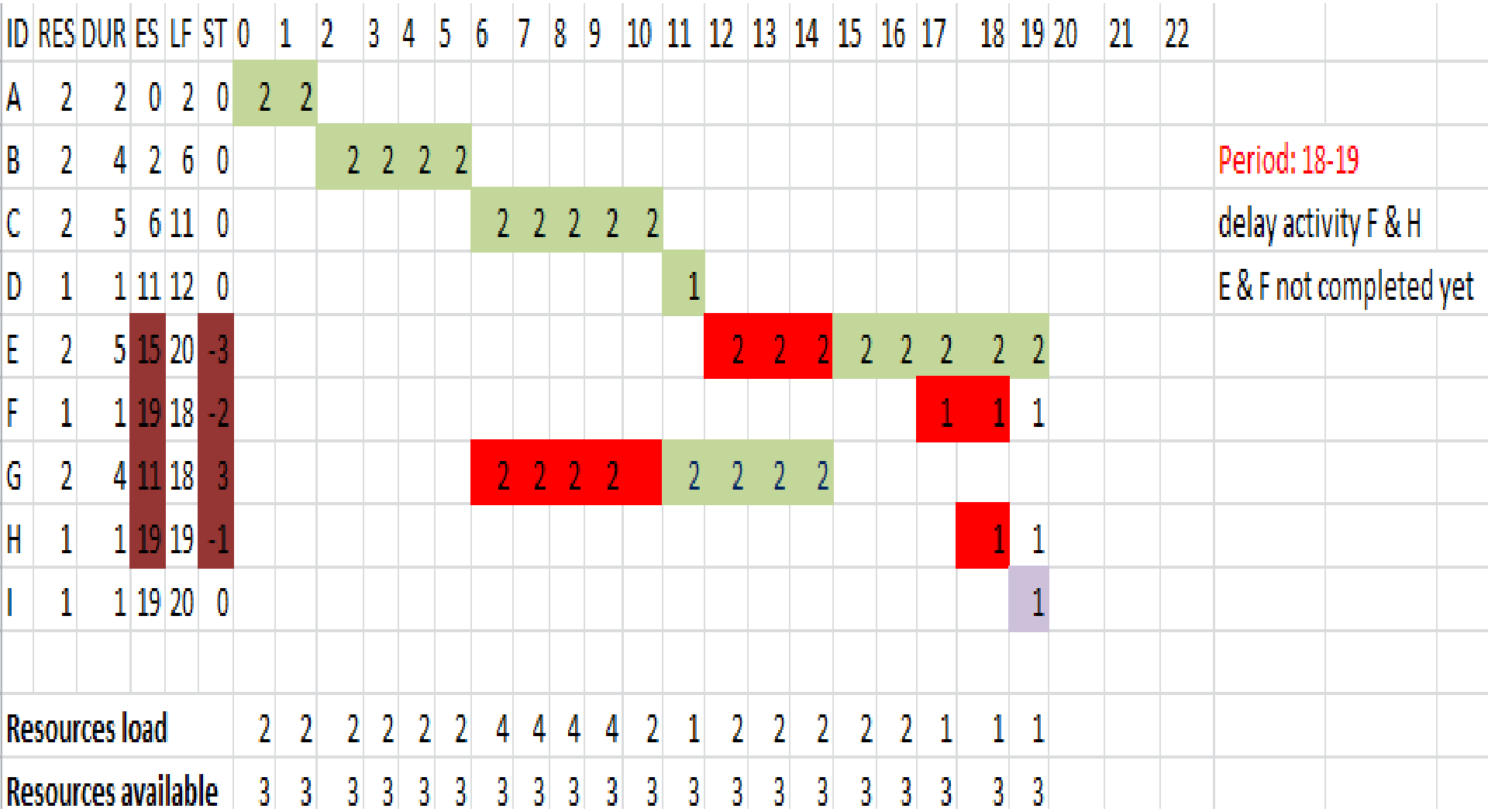
Period: 16-17

remain unchange

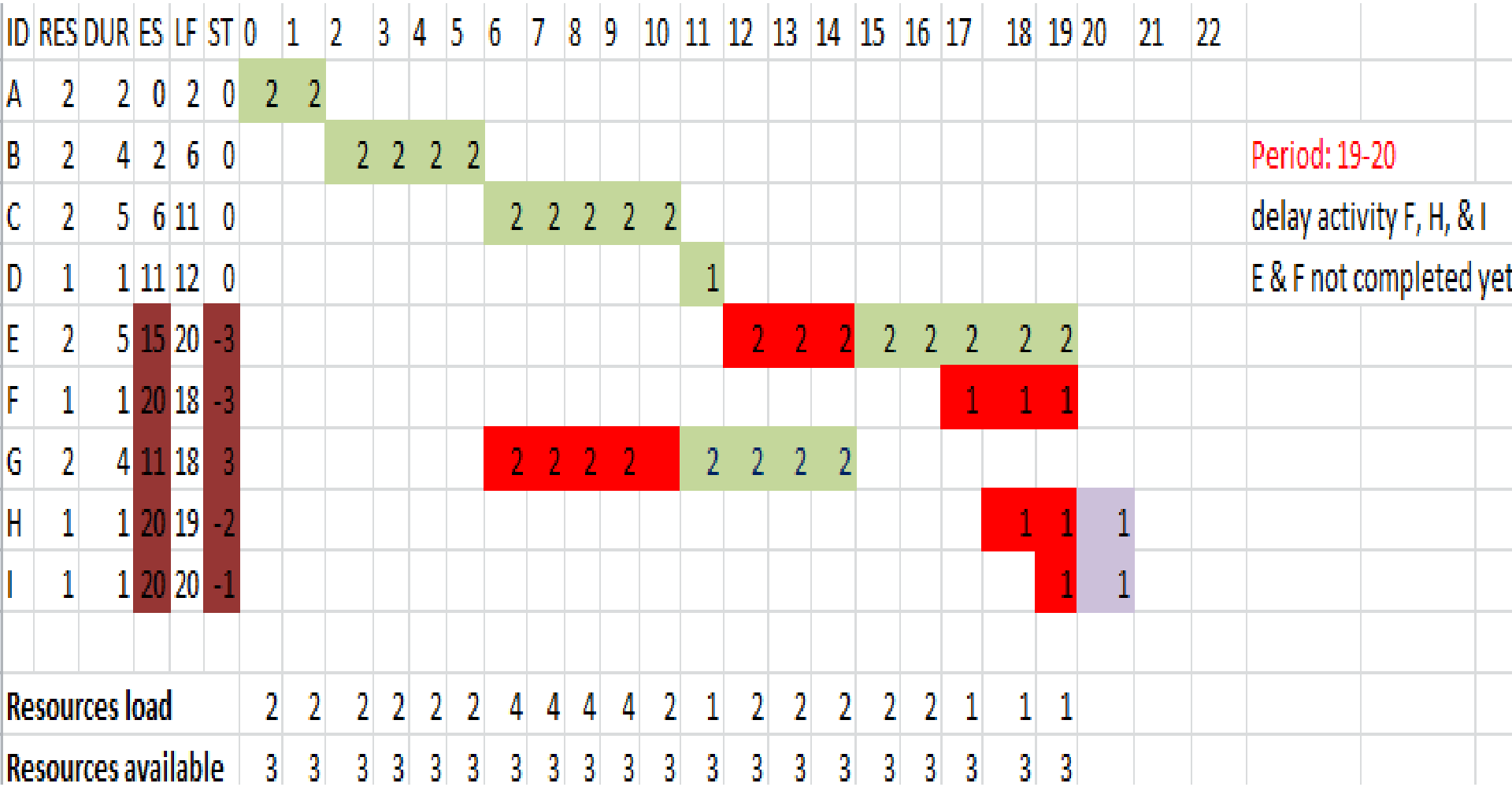
Step 4. move to period: 17-18



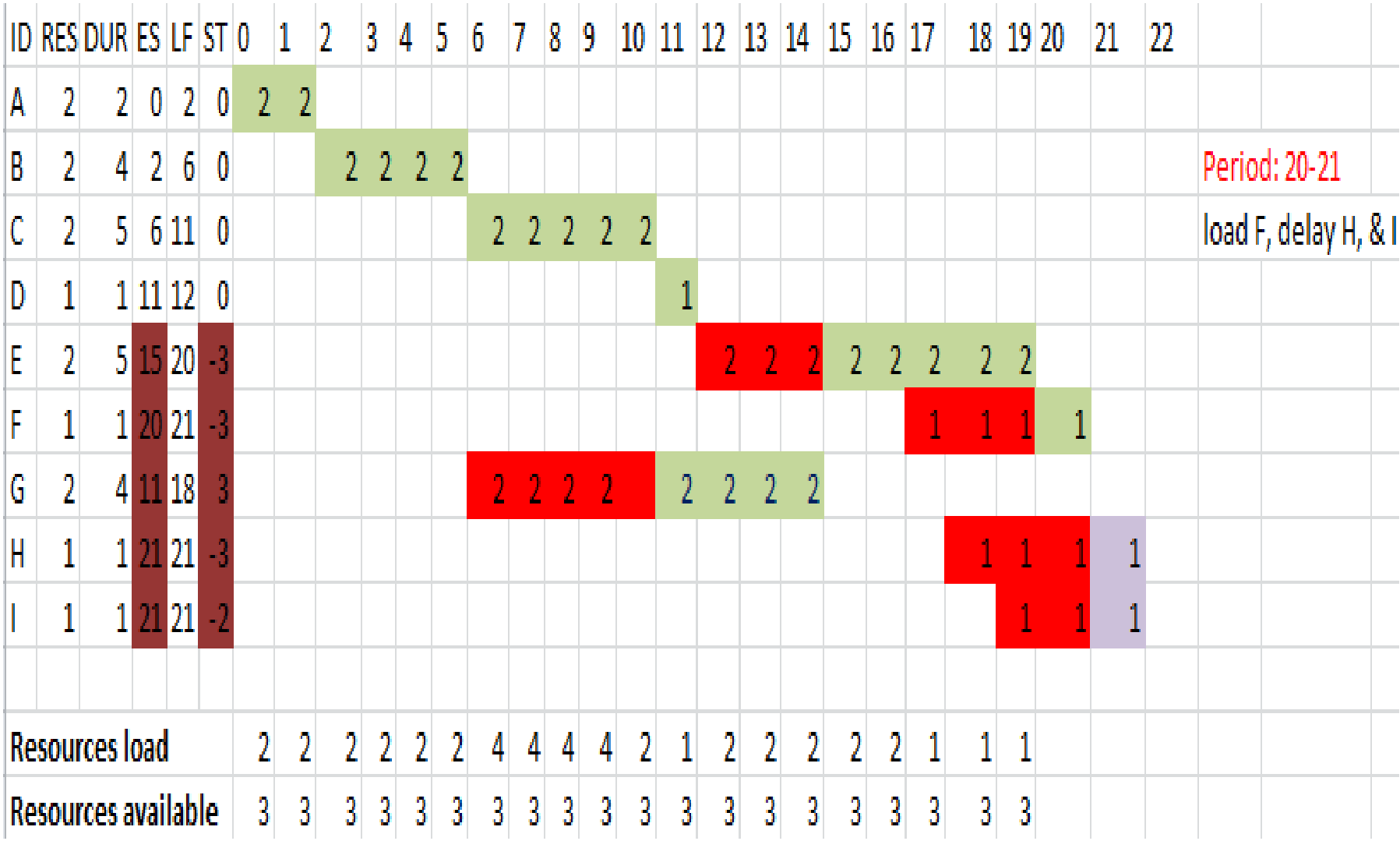
Step 4. move to period: 18-19



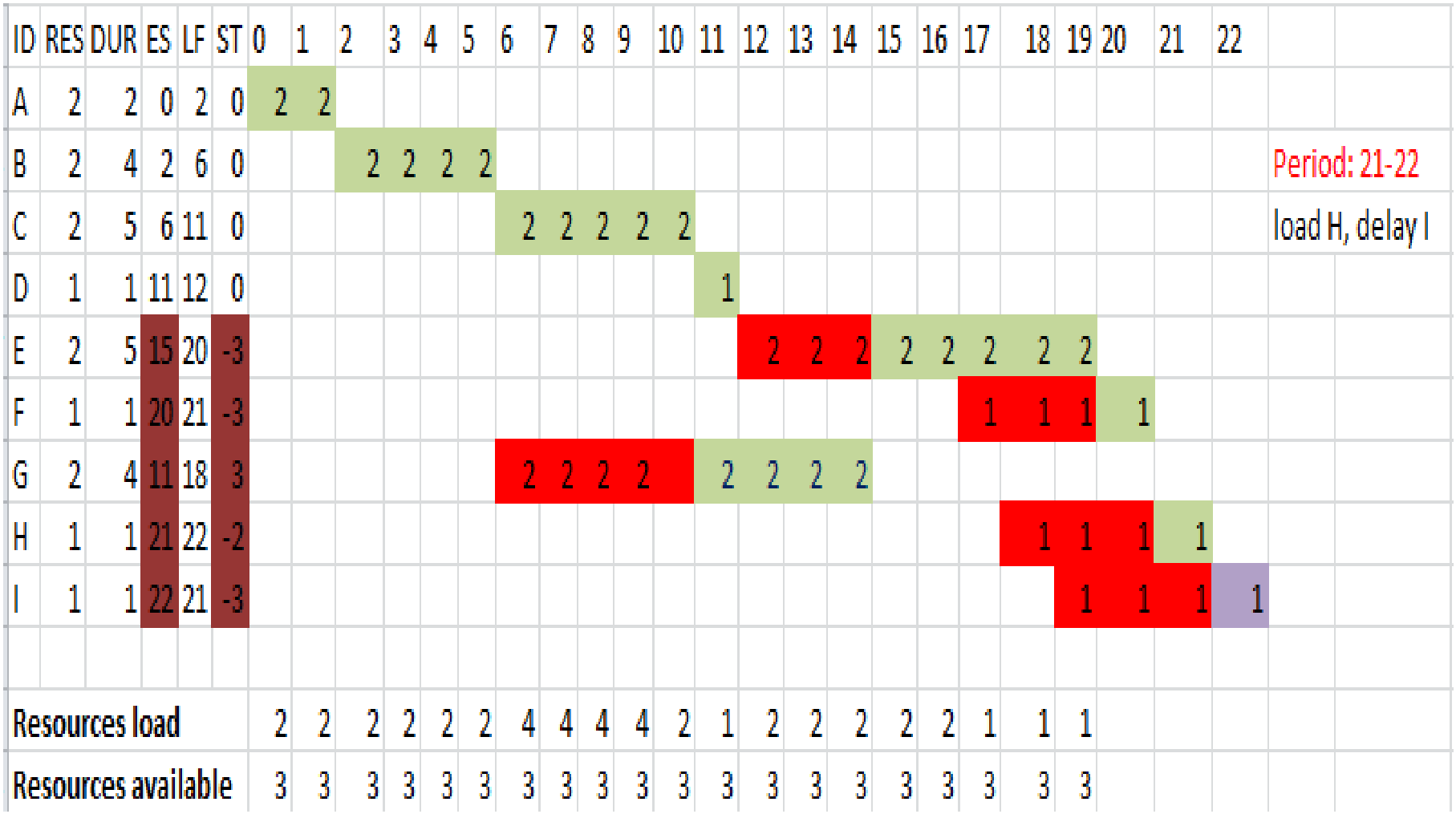
Step 4. move to period: 19-20



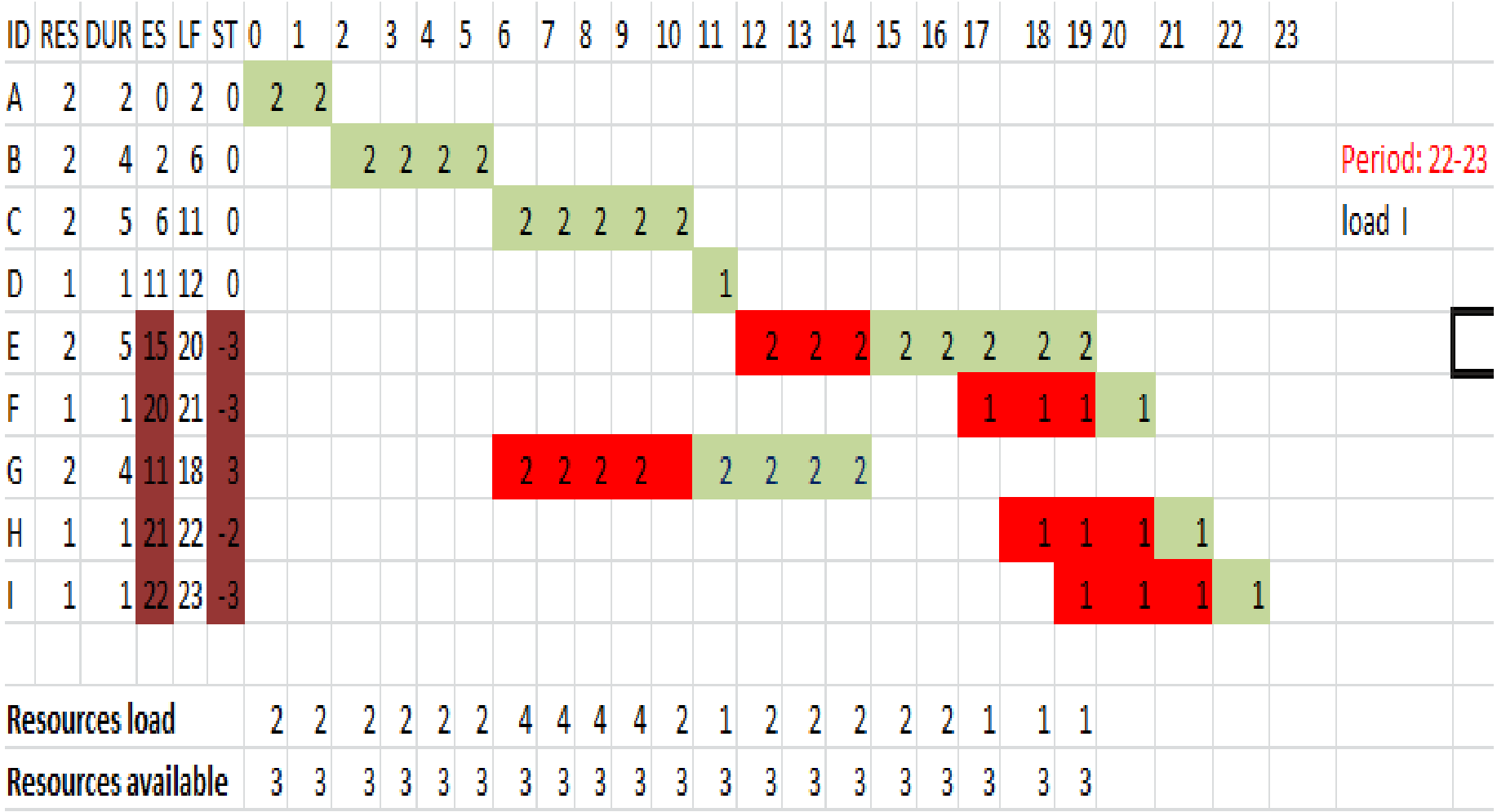
Step 4. move to period: 20-21



Step 4. move to period: 21-22



Step 4. move to period: 22-23



ID	RES	DUR	ES	LF	ST	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
A	2	2	0	2	0	2	2																						
B	2	4	2	6	0			2	2	2	2																		
C	2	5	6	11	0							2	2	2	2	2													
D	1	1	11	12	0												1												
E	2	5	15	20	-3													2	2	2	2	2	2	2	2				
F	1	1	20	21	-3																		1	1	1	1			
G	2	4	11	18	3							2	2	2	2		2	2	2	2									
H	1	1	21	22	-2																			1	1	1	1		
I	1	1	22	23	-3																				1	1	1	1	
Resources load						2	2	2	2	2	2	4	4	4	4	2	1	2	2	2	2	2	1	1	1				
Resources available						3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3				

Step 4. Update schedule