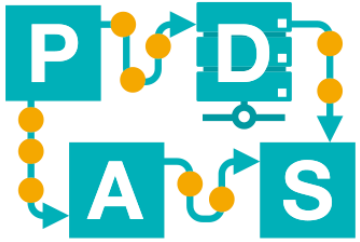
Performance Analysis

Bianka Bakullari

BPI-I11



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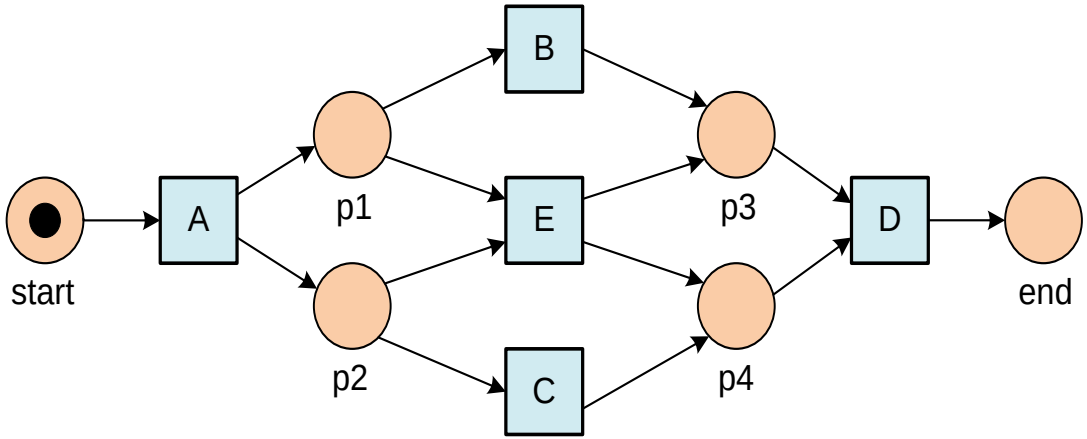
Exercise 1 (Service times)

a) Given is the following process model discovered from the given event log. What are the service times per case?



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3	A	start	Nik	83
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3	E	start	Nik	95
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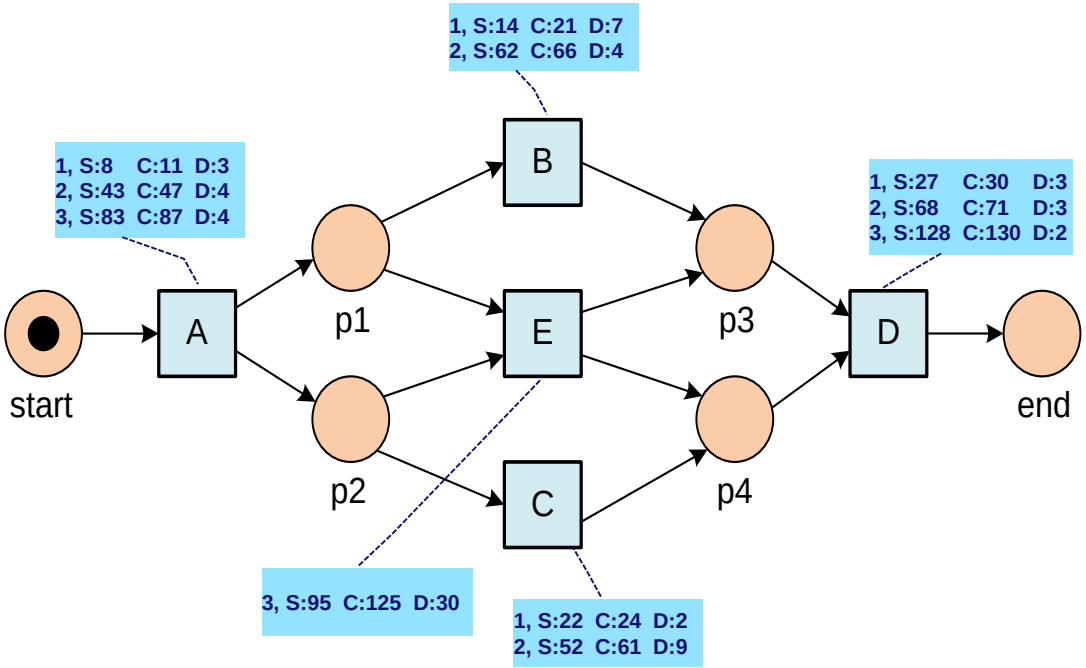
3	D	start	Rene	128
3	D	complete	Rene	130

Service time: start, complete, duration (per activity, per case)

Exercise 1 – Solution



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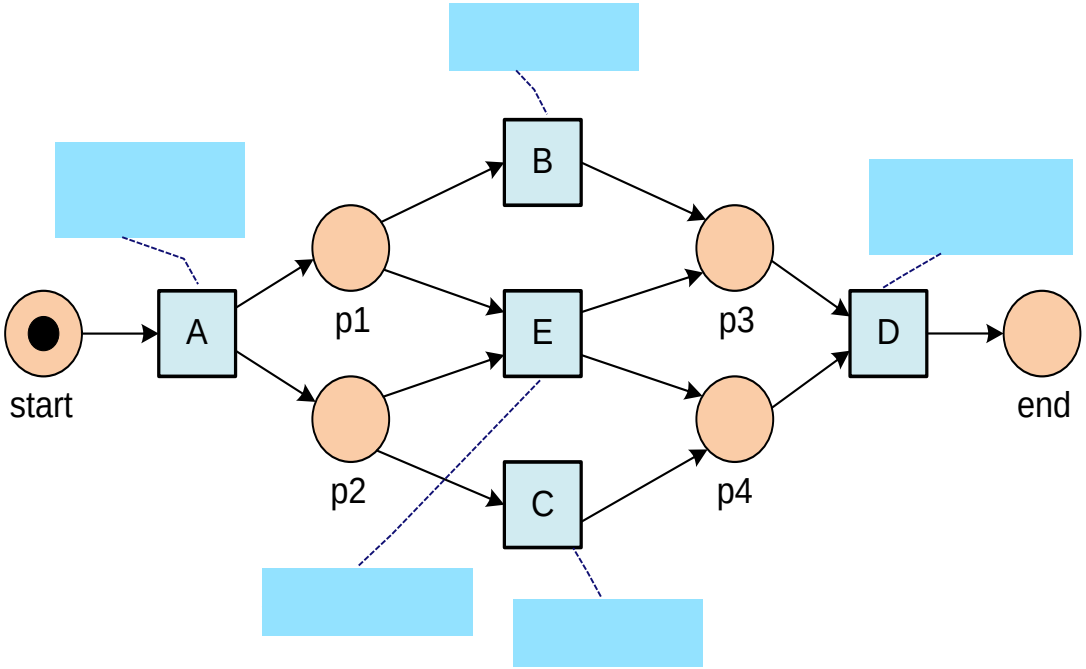
S: Start
C: Complete
D: Duration

Exercise 1 – Solution steps



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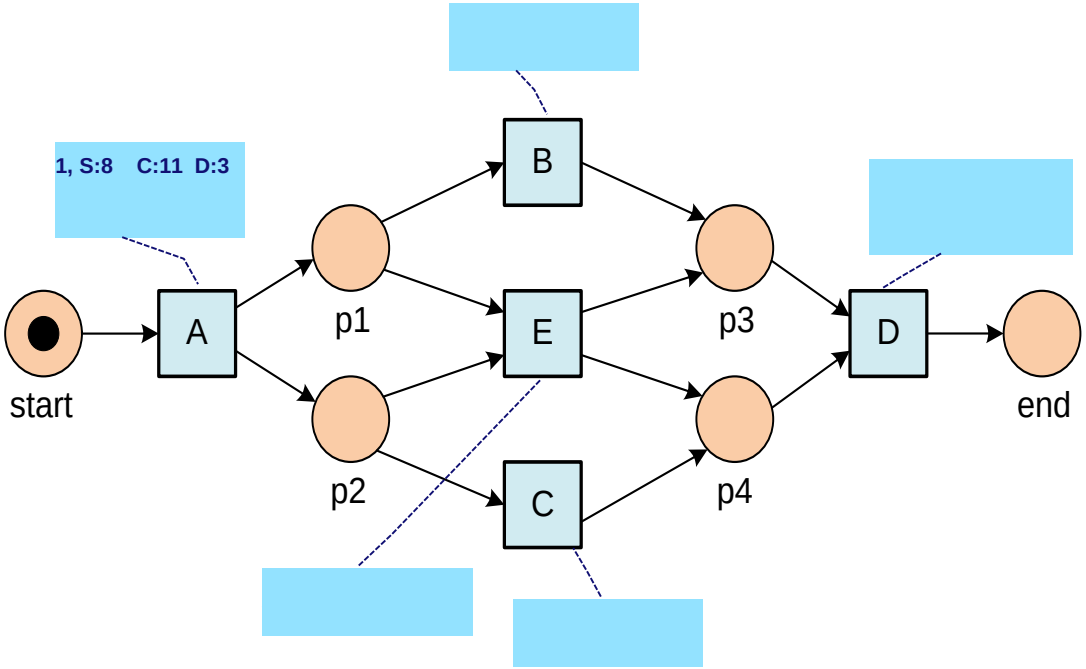

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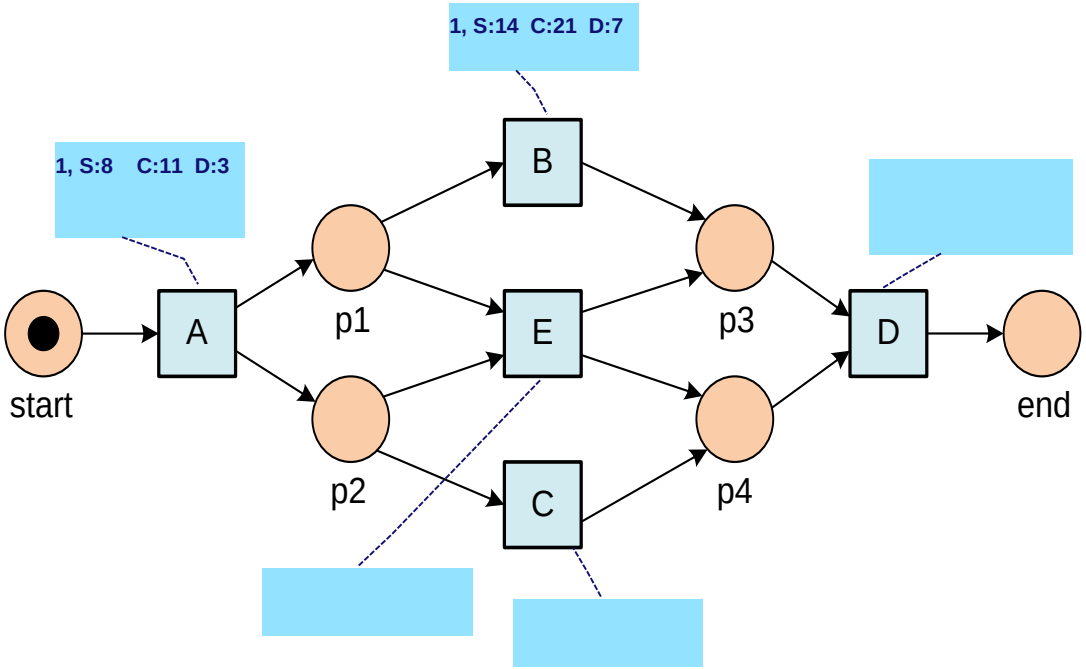

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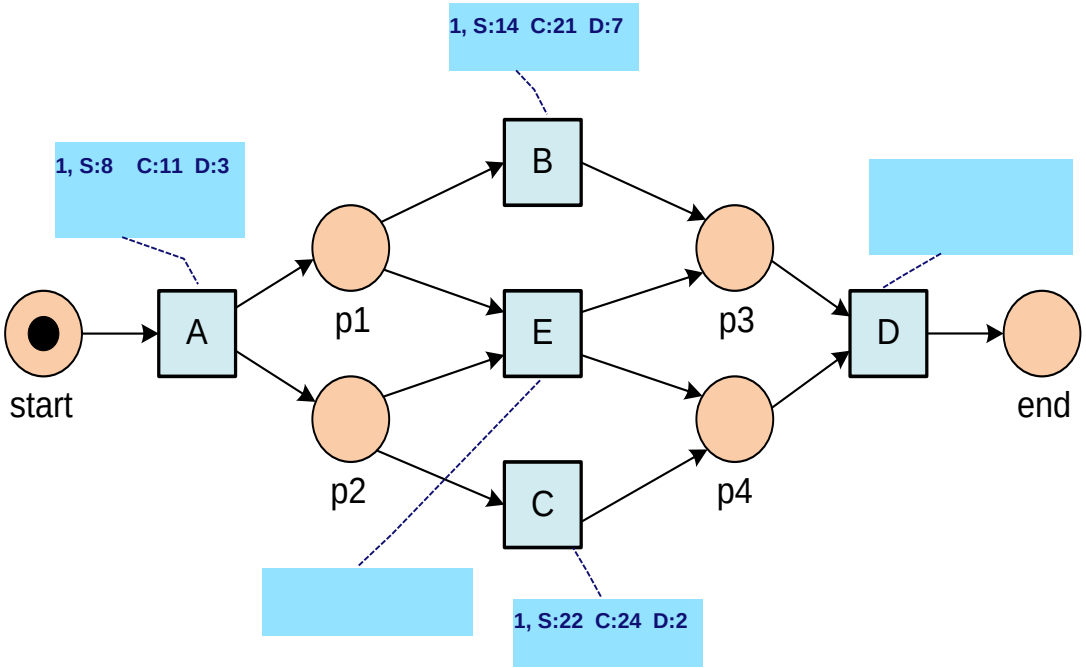

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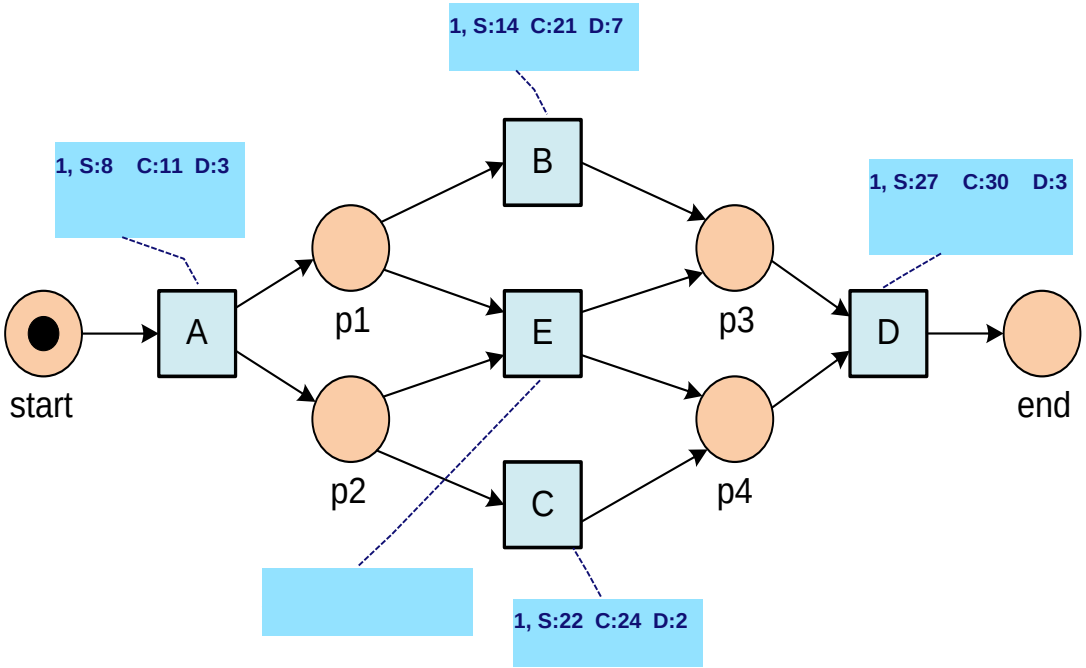

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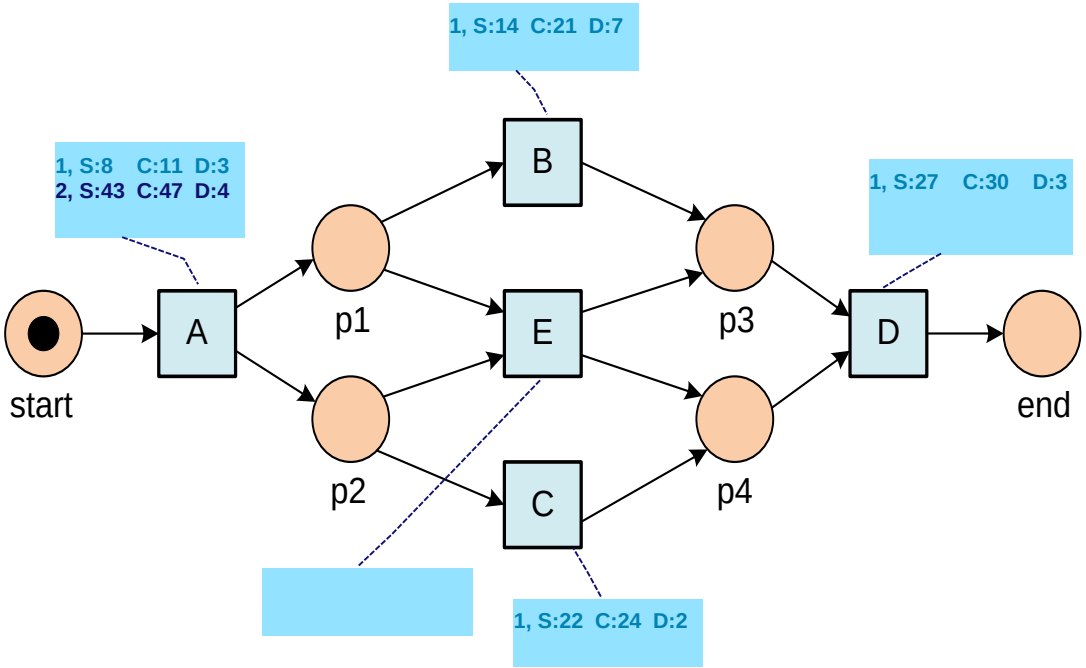

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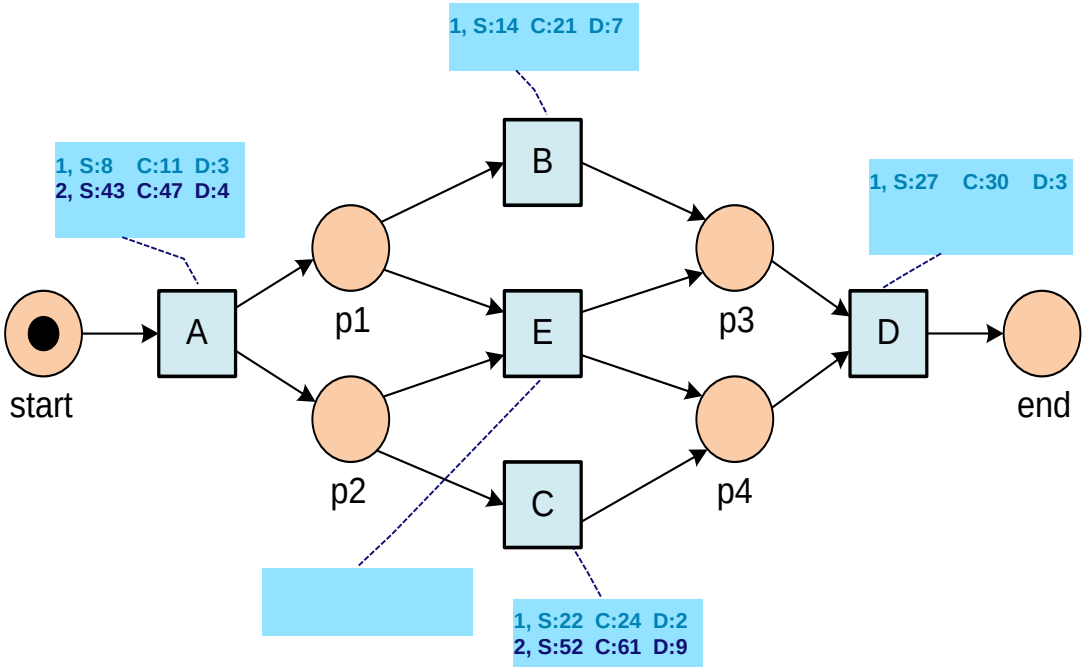

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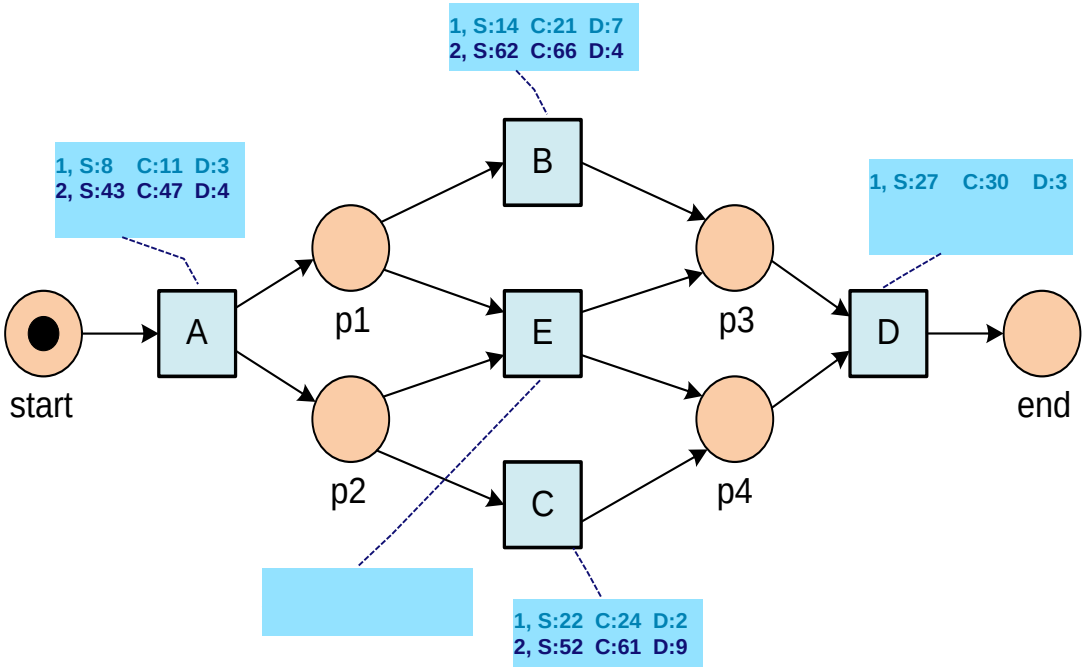

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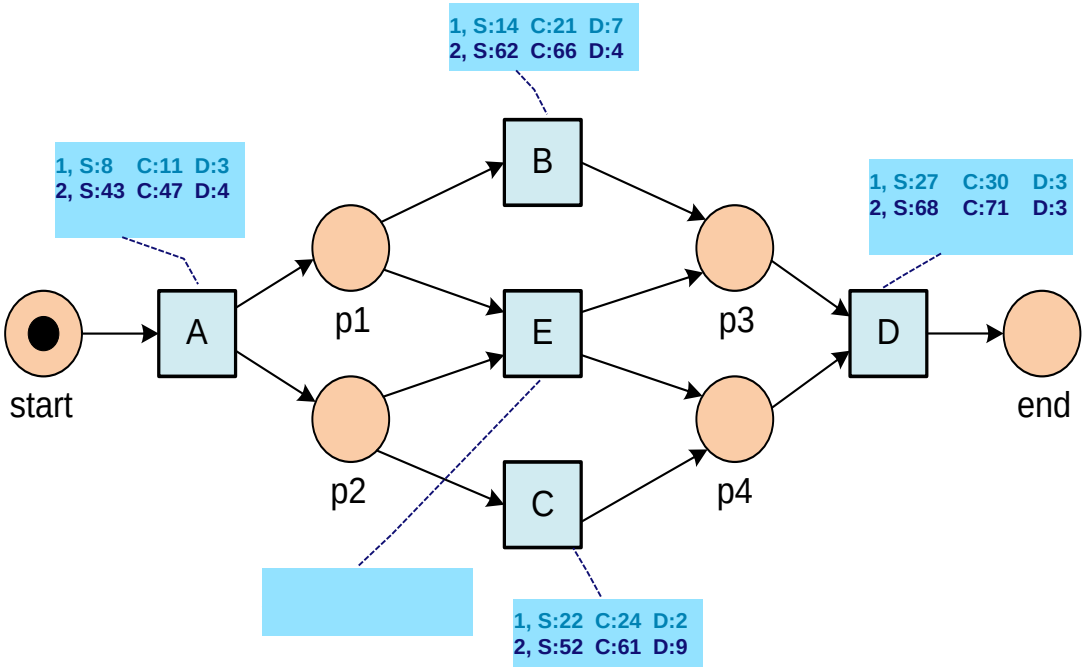

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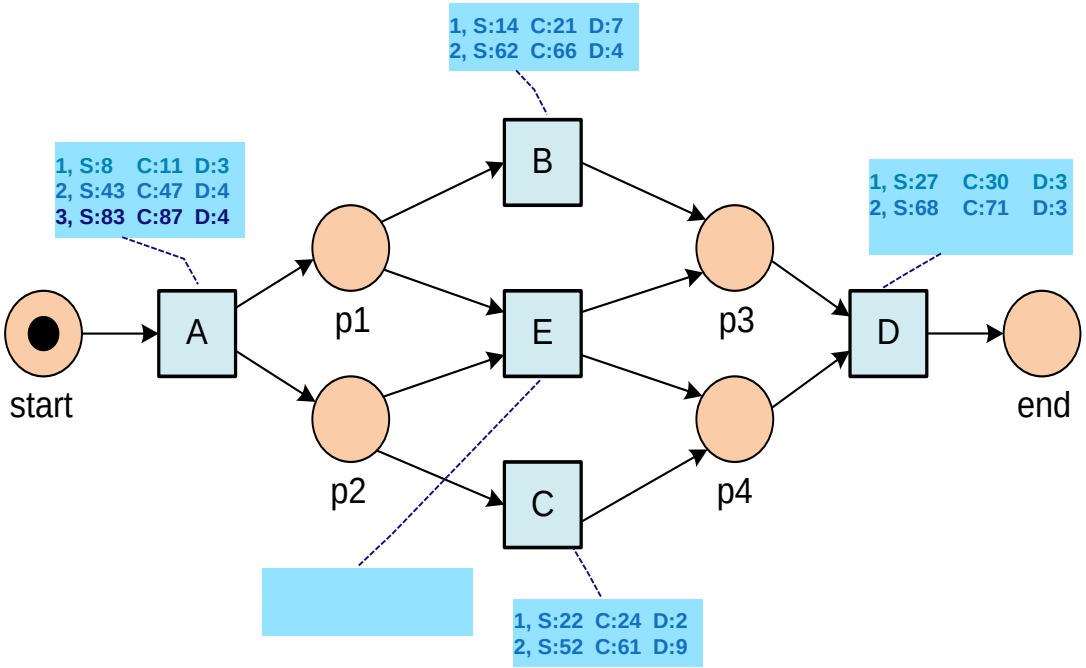

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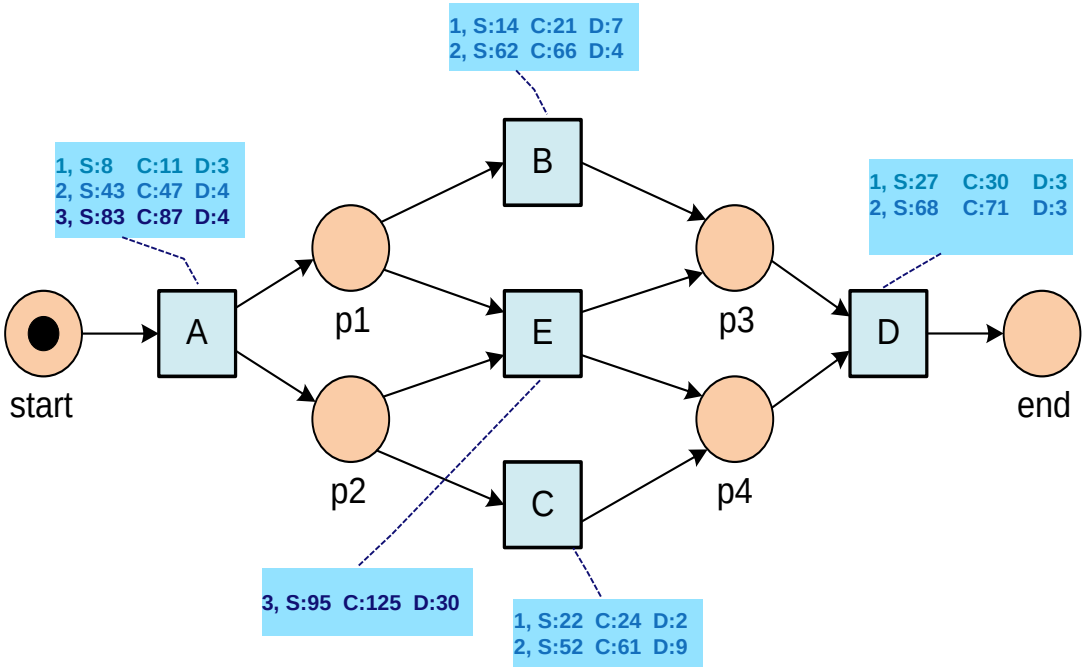

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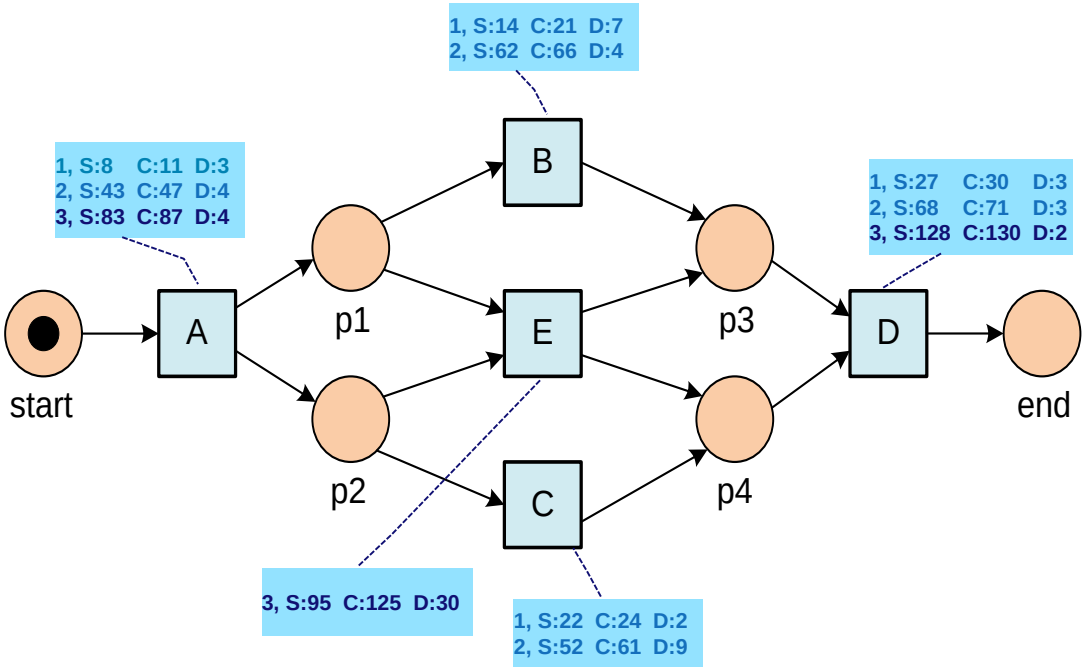

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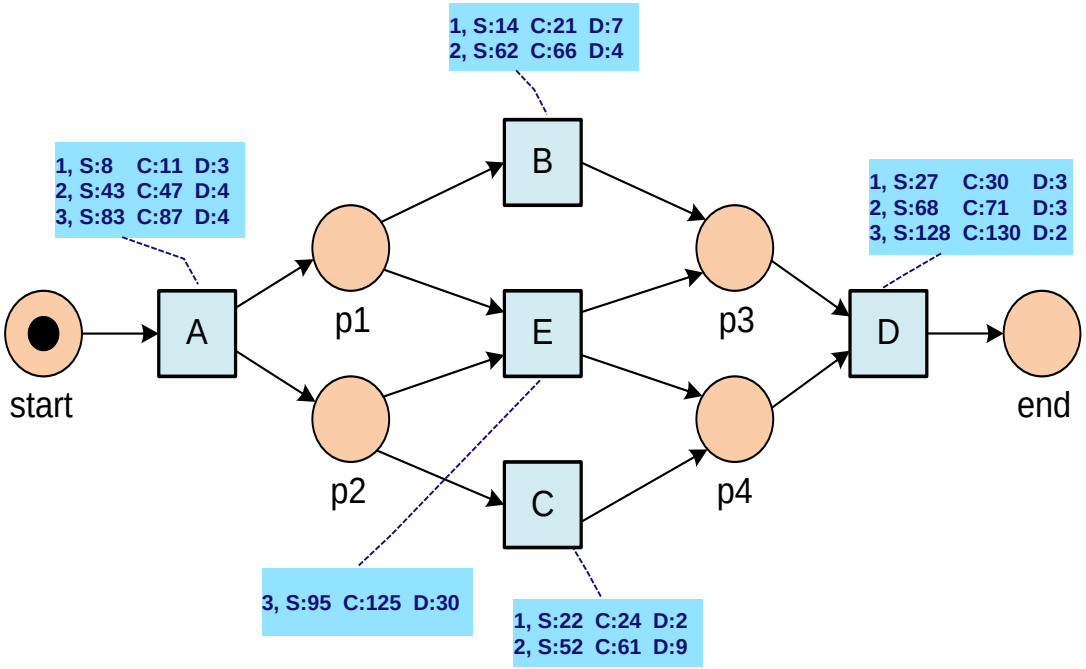

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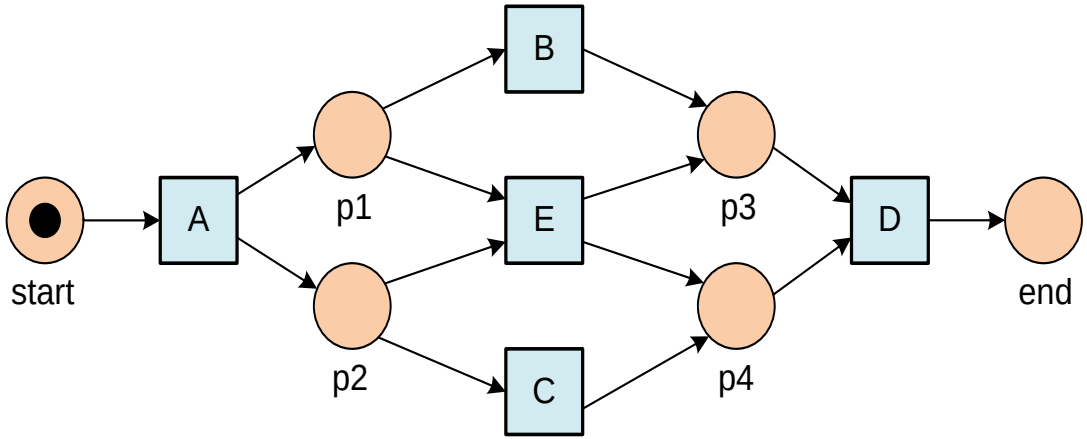
Exercise 1 (Service times)

b) What is the average duration of each activity in the given event log?



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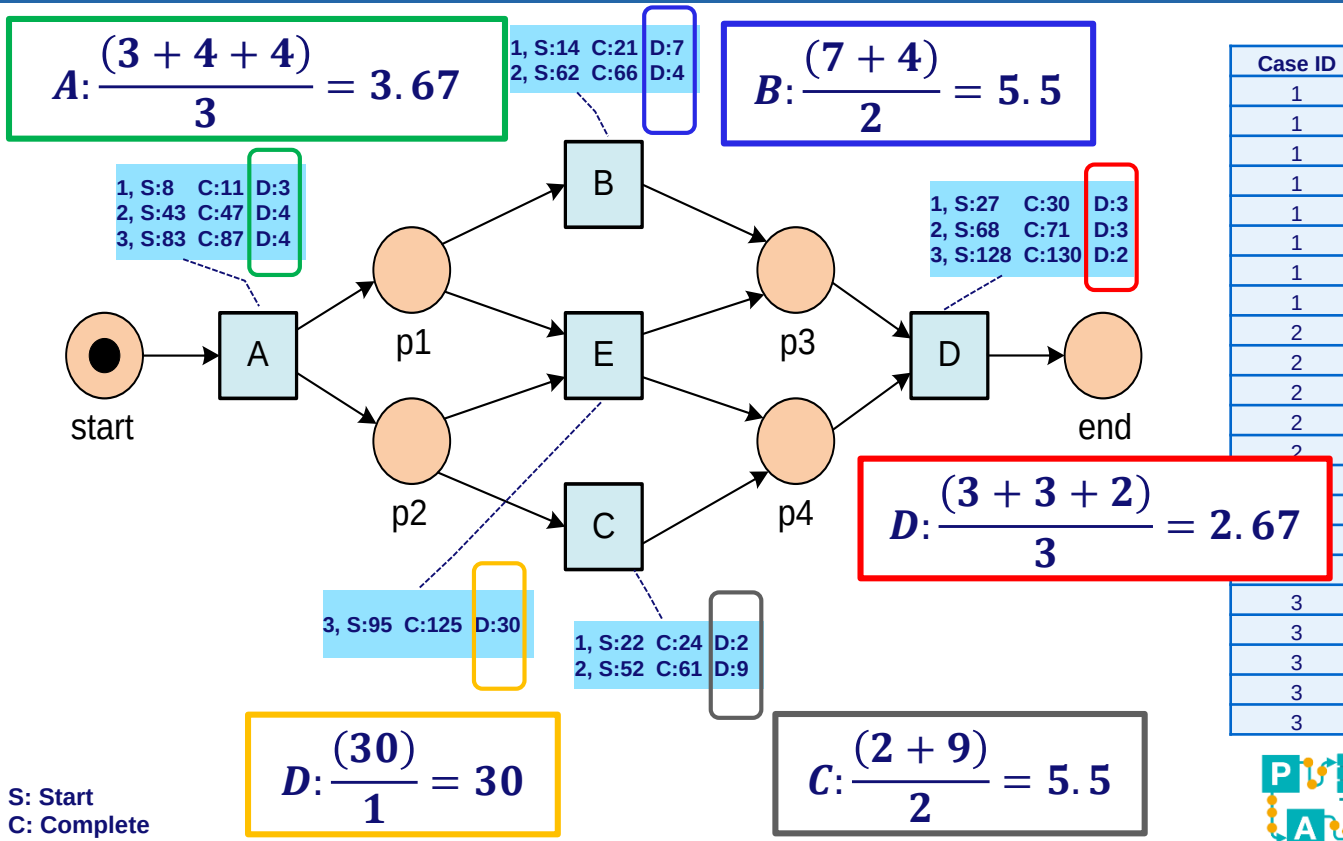

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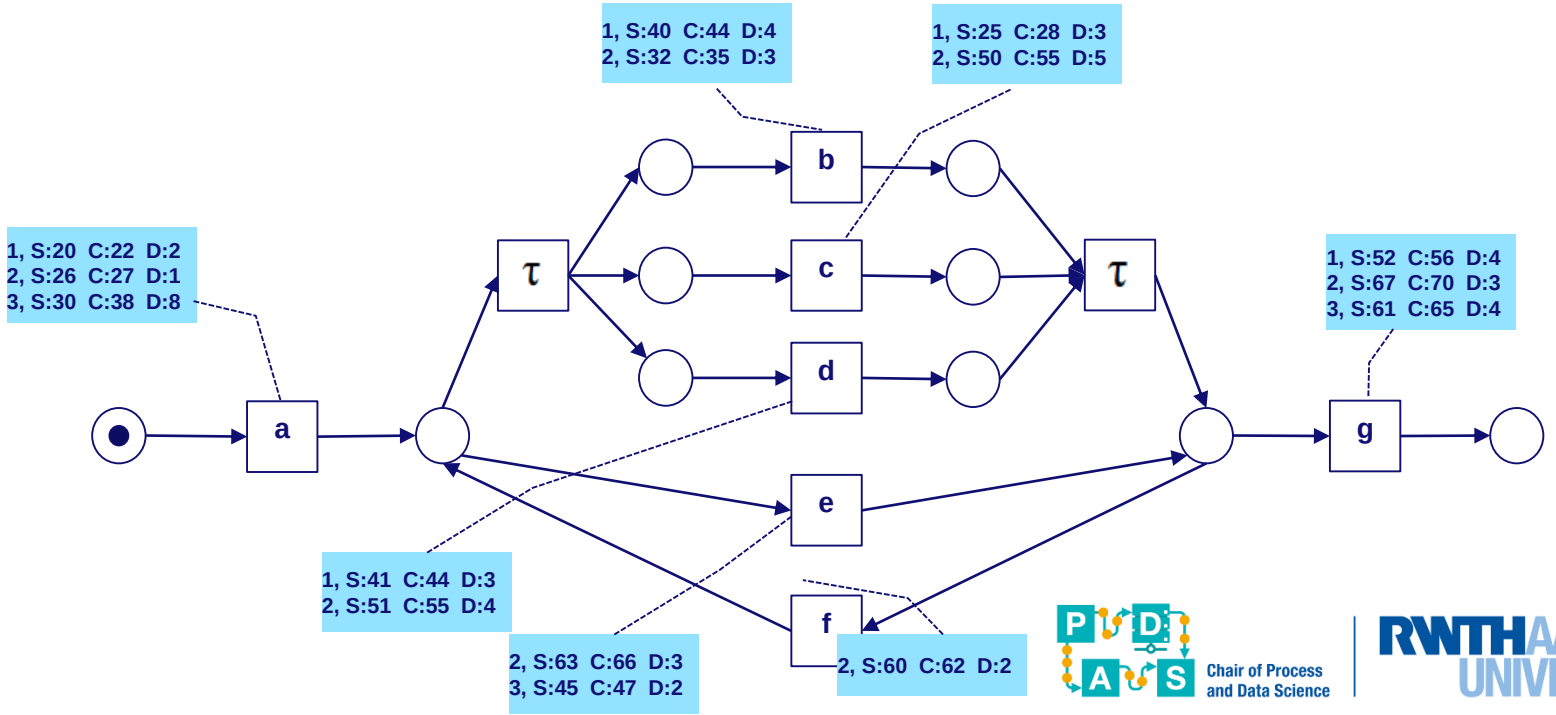
Exercise 2 (Waiting times)

a) Given is the following process model and the service times. For each place and case (1, 2, and 3), compute the waiting time.



S: Start
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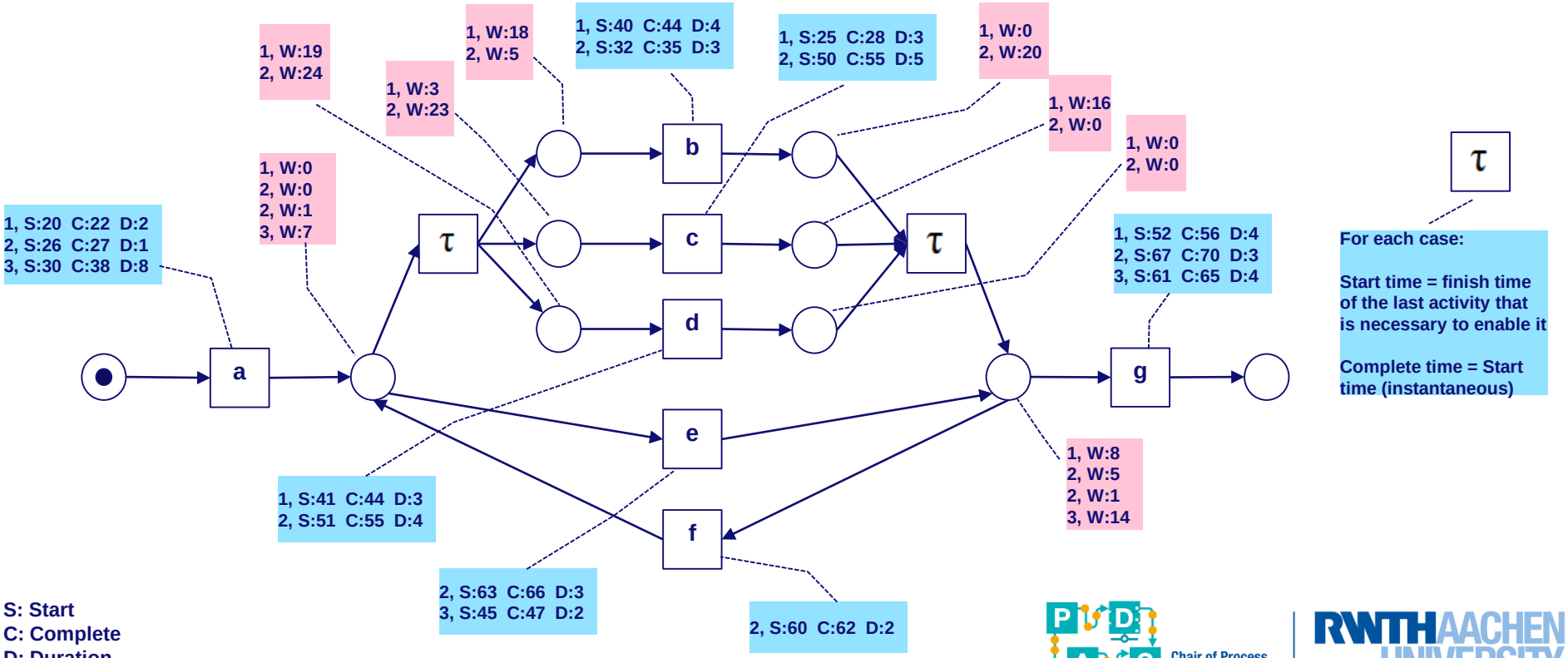
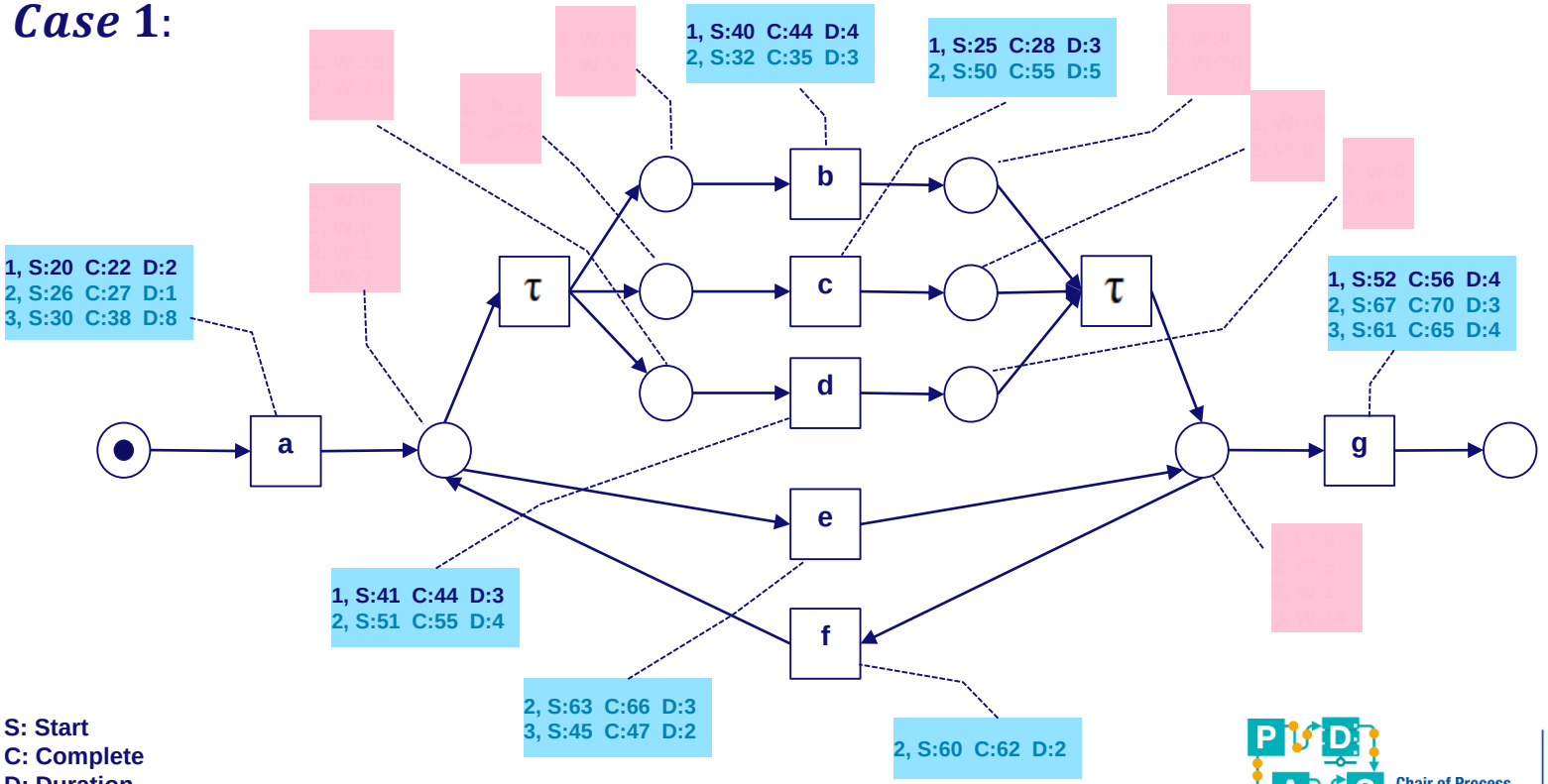
Exercise 2 – Solution



S: Start
C: Complete
D: Duration
W: Waiting

Exercise 2 – Solution steps (case 1)

***Case 1*:**



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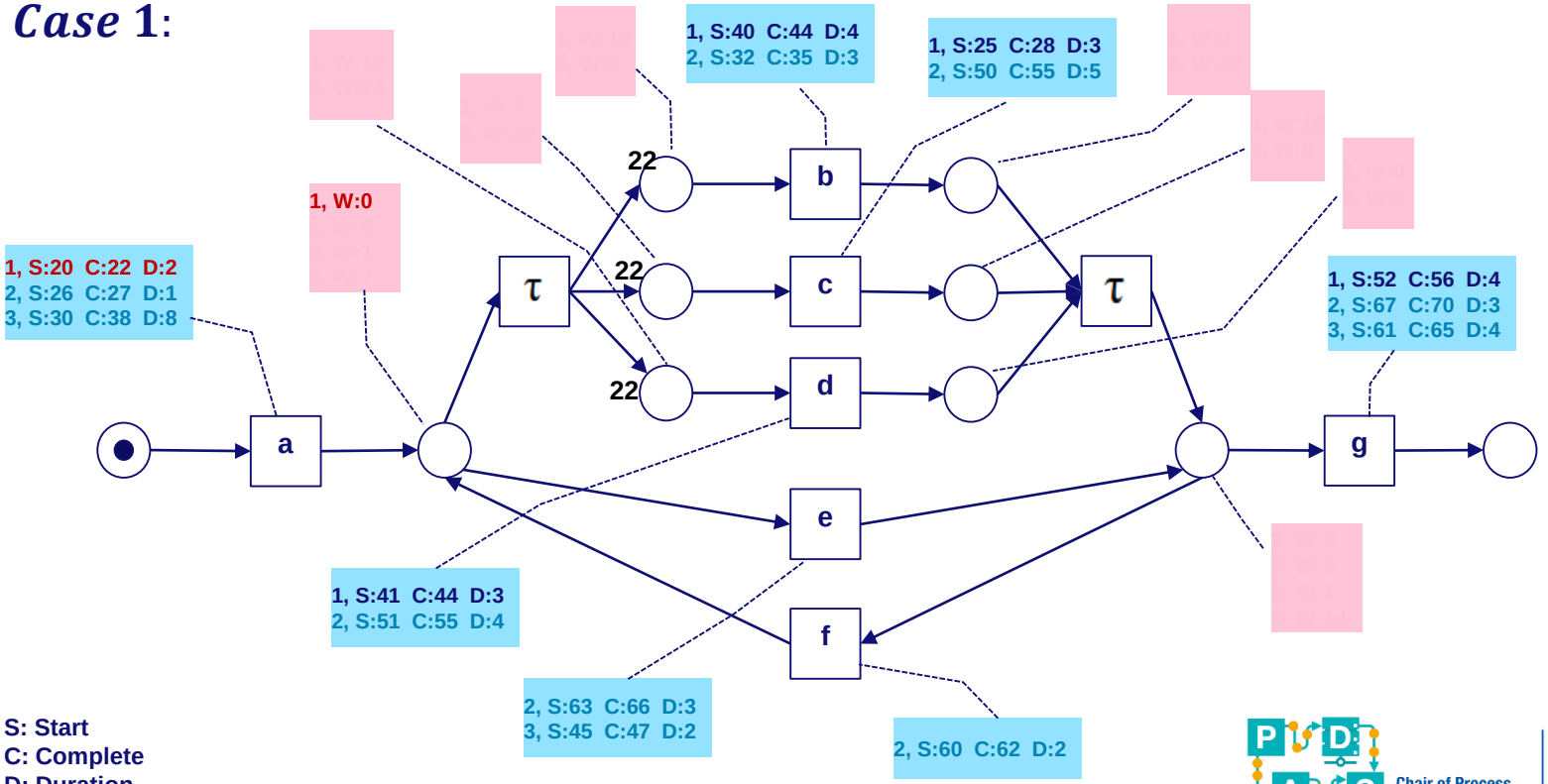
Exercise 2 – Solution steps (case 1)

Case 1:



S: Start
C: Complete
D: Duration
W: Waiting

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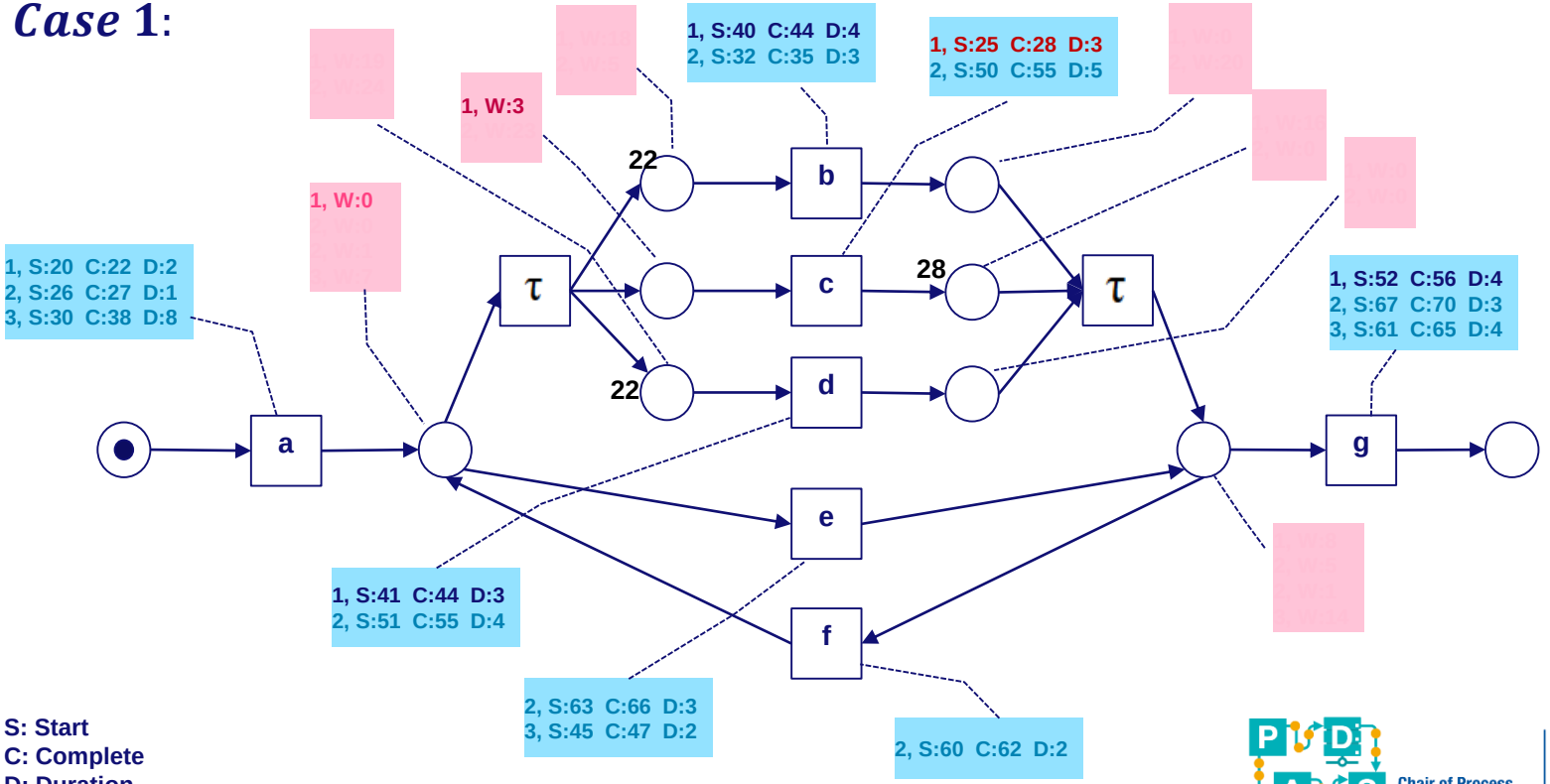
Exercise 2 – Solution steps (case 1)

***Case 1*:**



S: Start
C: Complete
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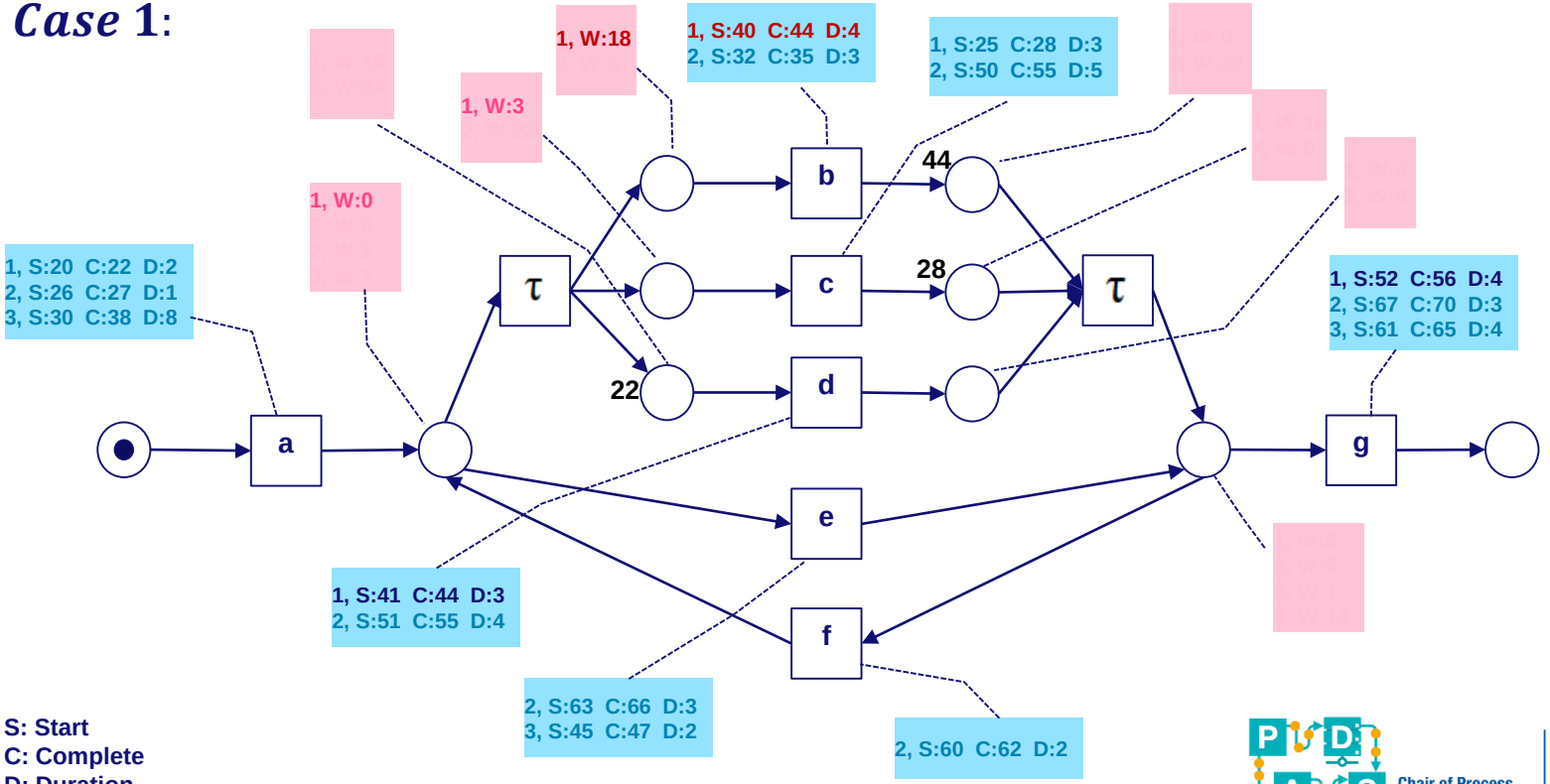
Case 1:



S: Start
C: Complete
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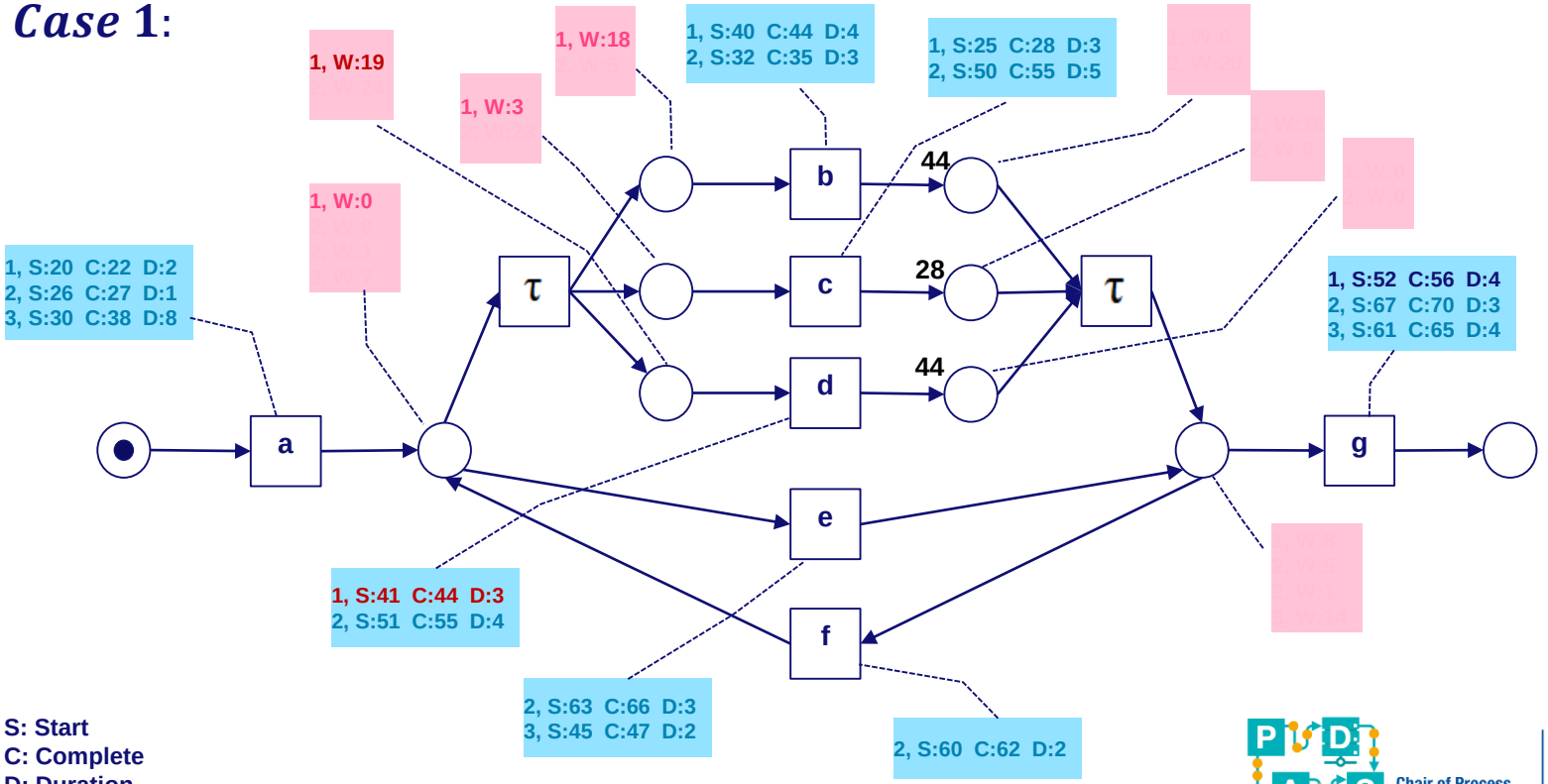
Exercise 2 – Solution steps (case 1)

Case 1:



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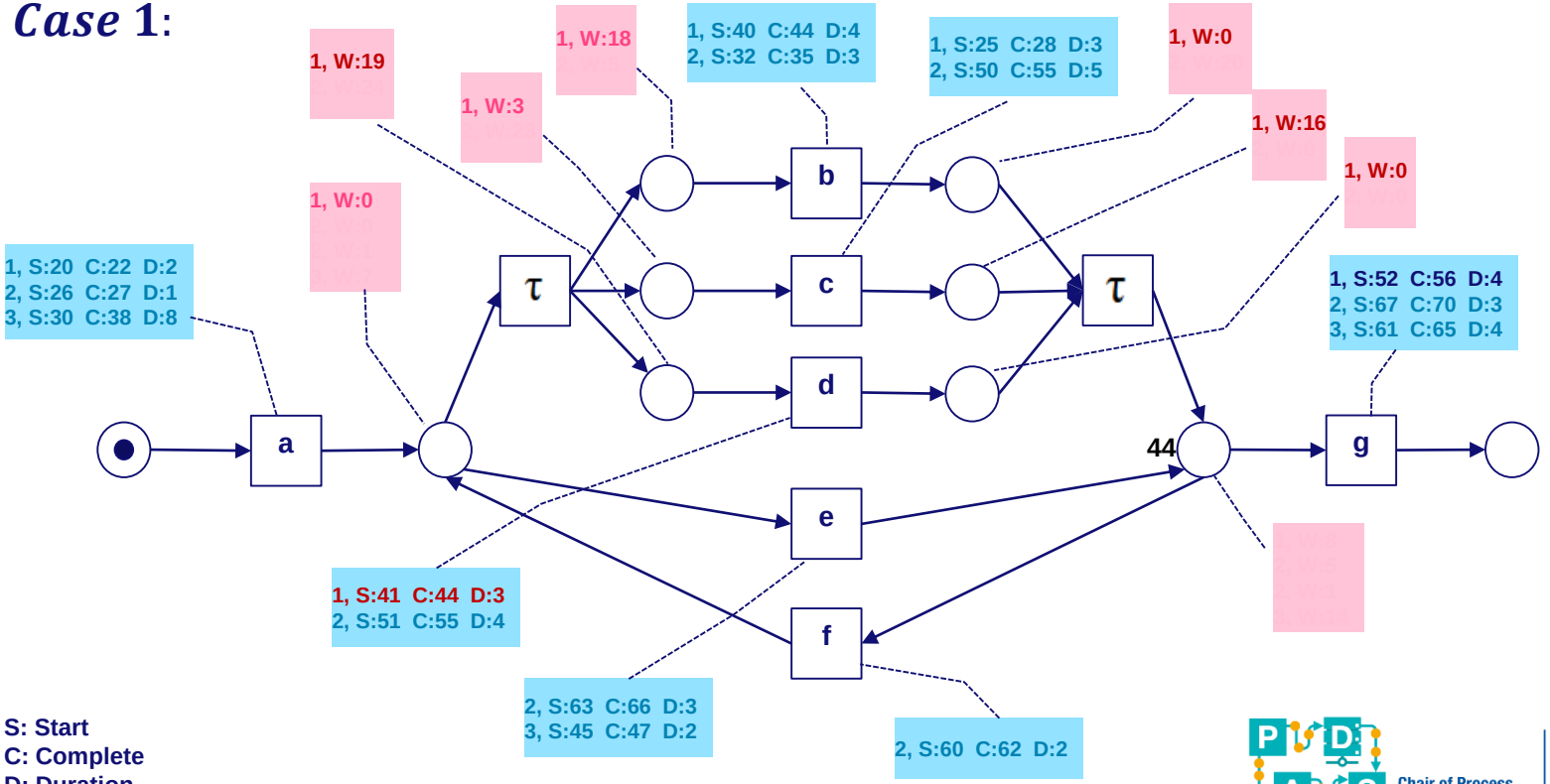

S: Start
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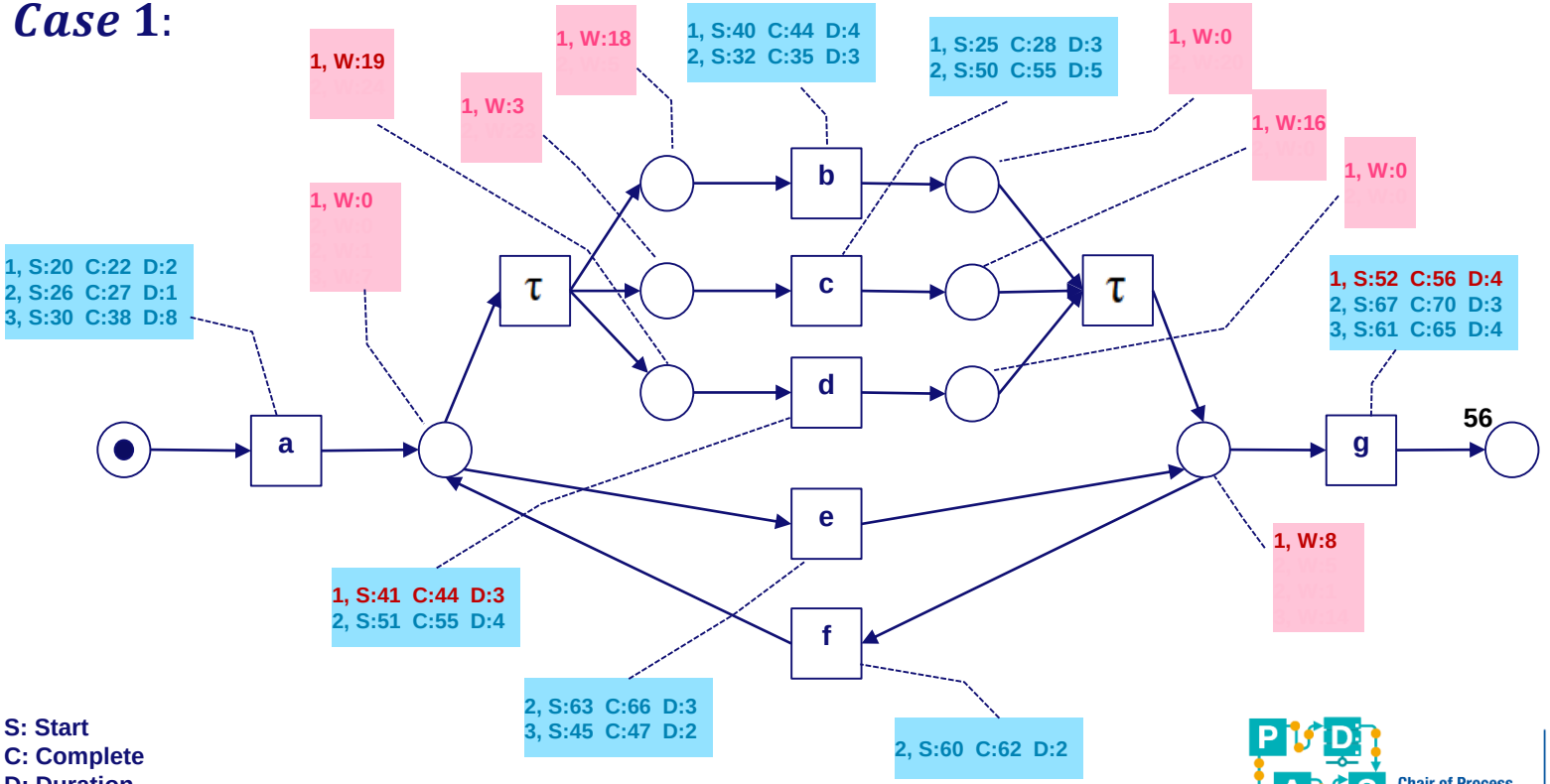
Exercise 2 – Solution steps (case 1)

***Case 1*:**



S: Start
C: Complete
D: Duration
W: Waiting

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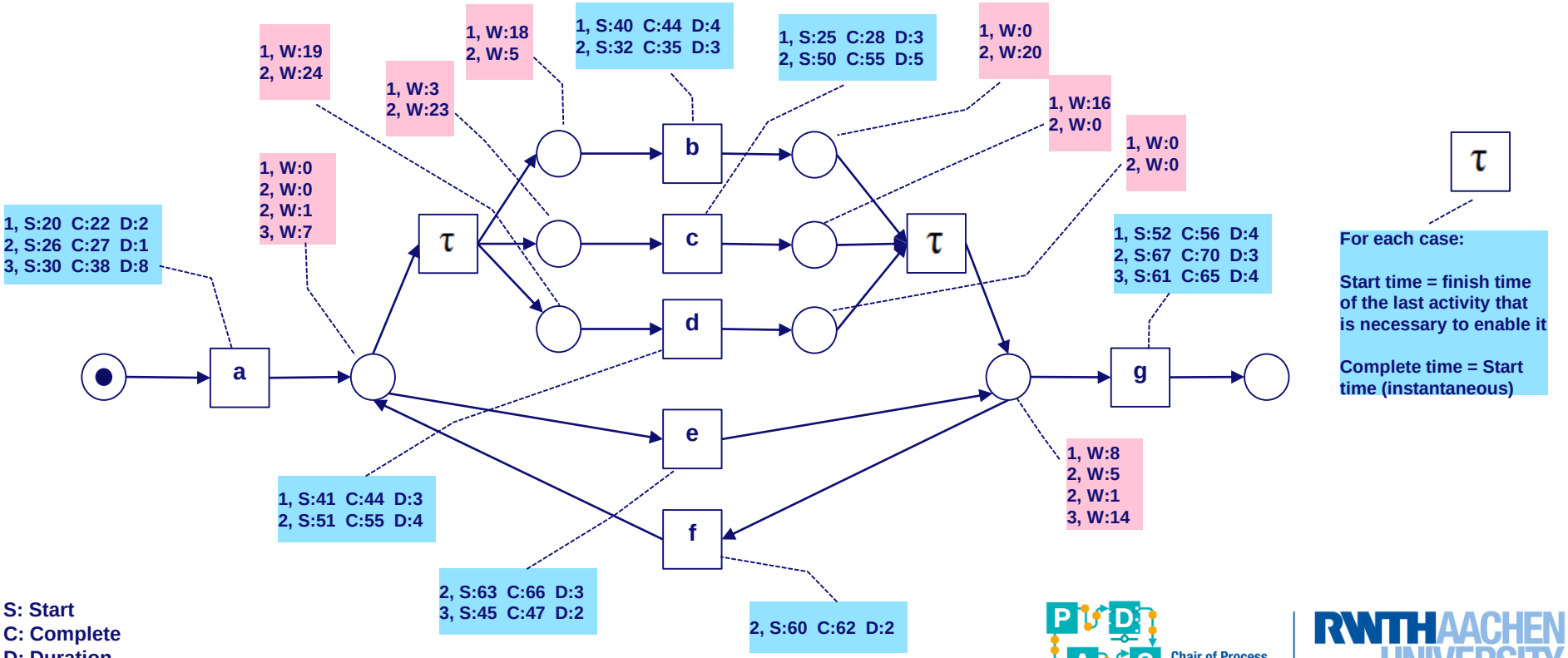
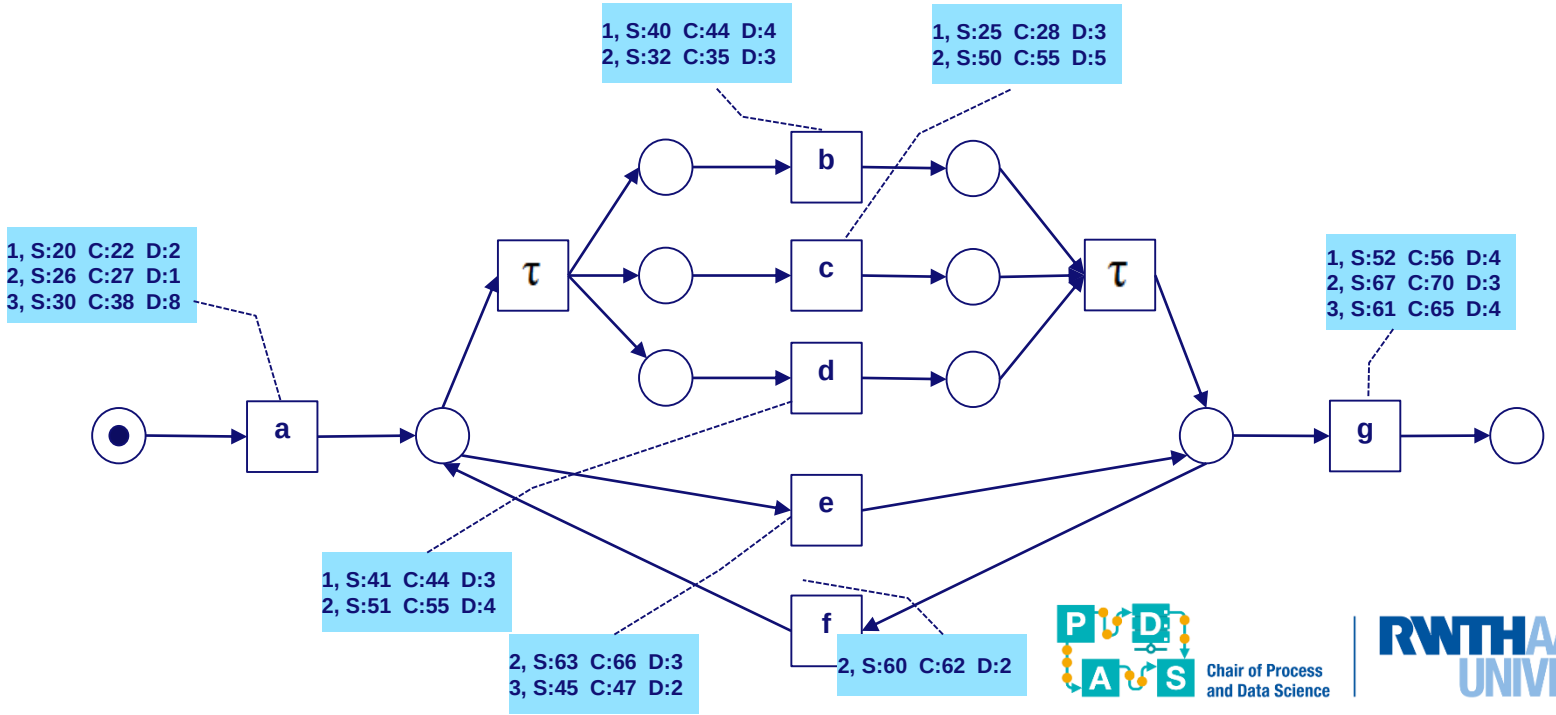
Exercise 2 – Solution



S: Start
C: Complete
D: Duration
W: Waiting

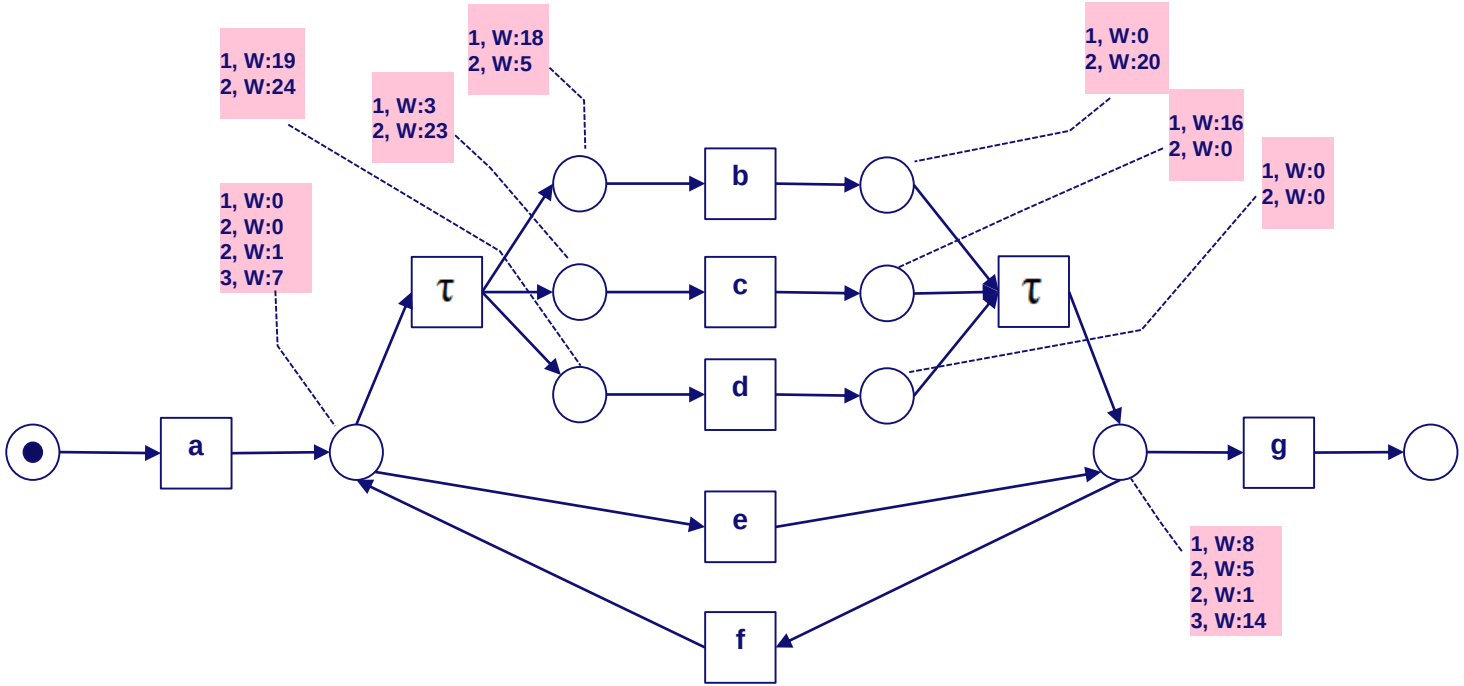
Exercise 2 (Waiting times)

b) What is the average waiting time for each place?



S: Start
C: Complete
D: Duration

Exercise 2 – Solution



W: Waiting

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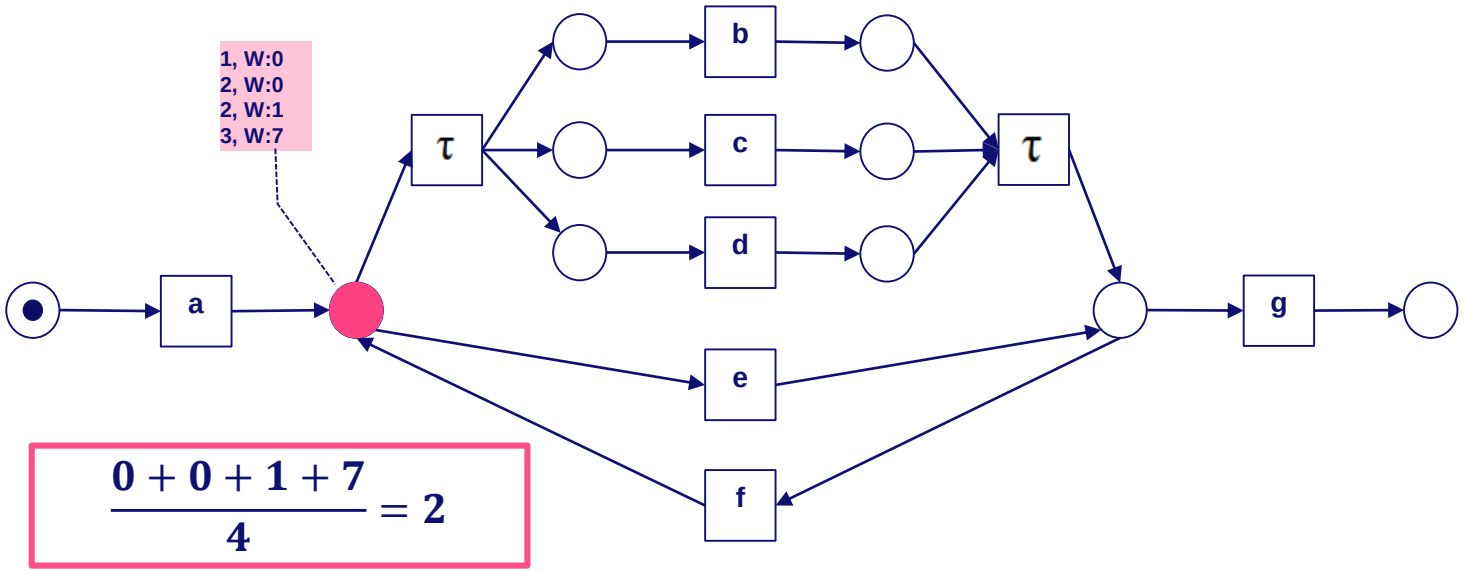
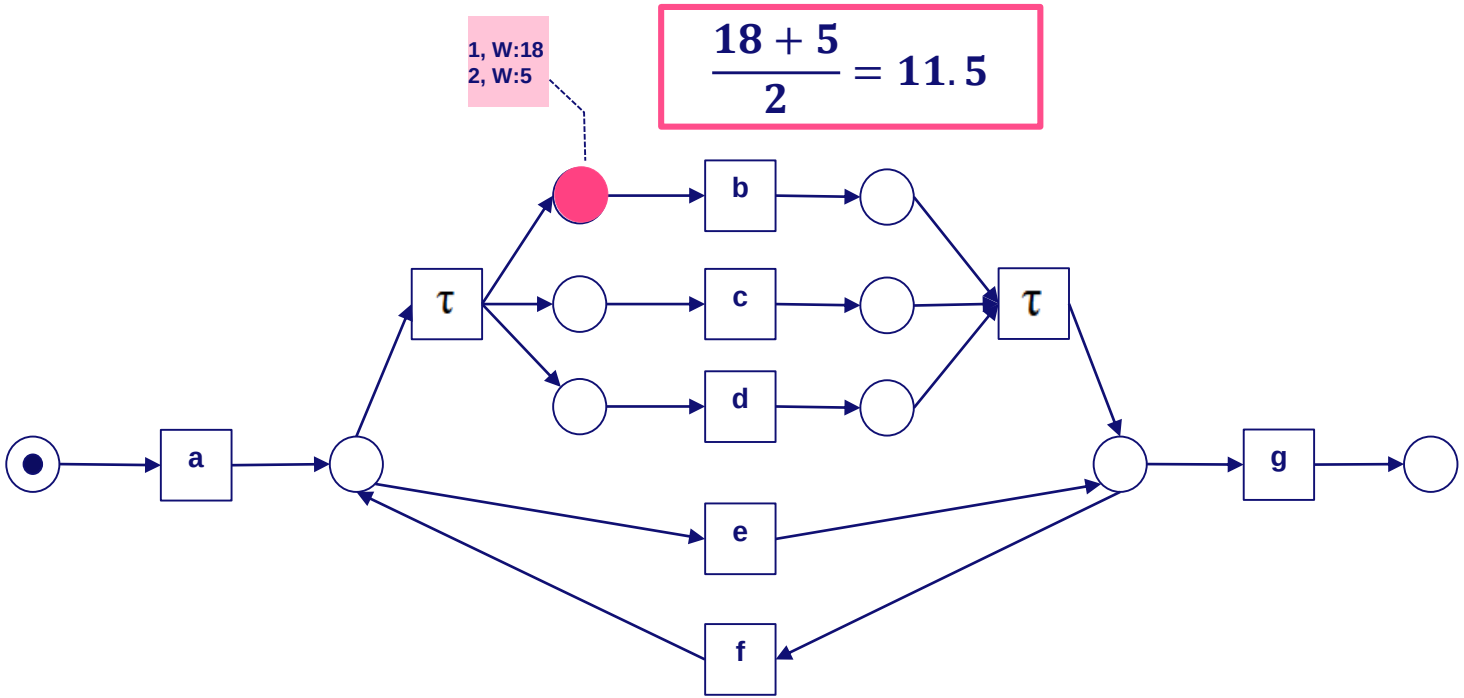
Exercise 2 – Solution



$$\frac{0+0+1+7}{4} = 2$$

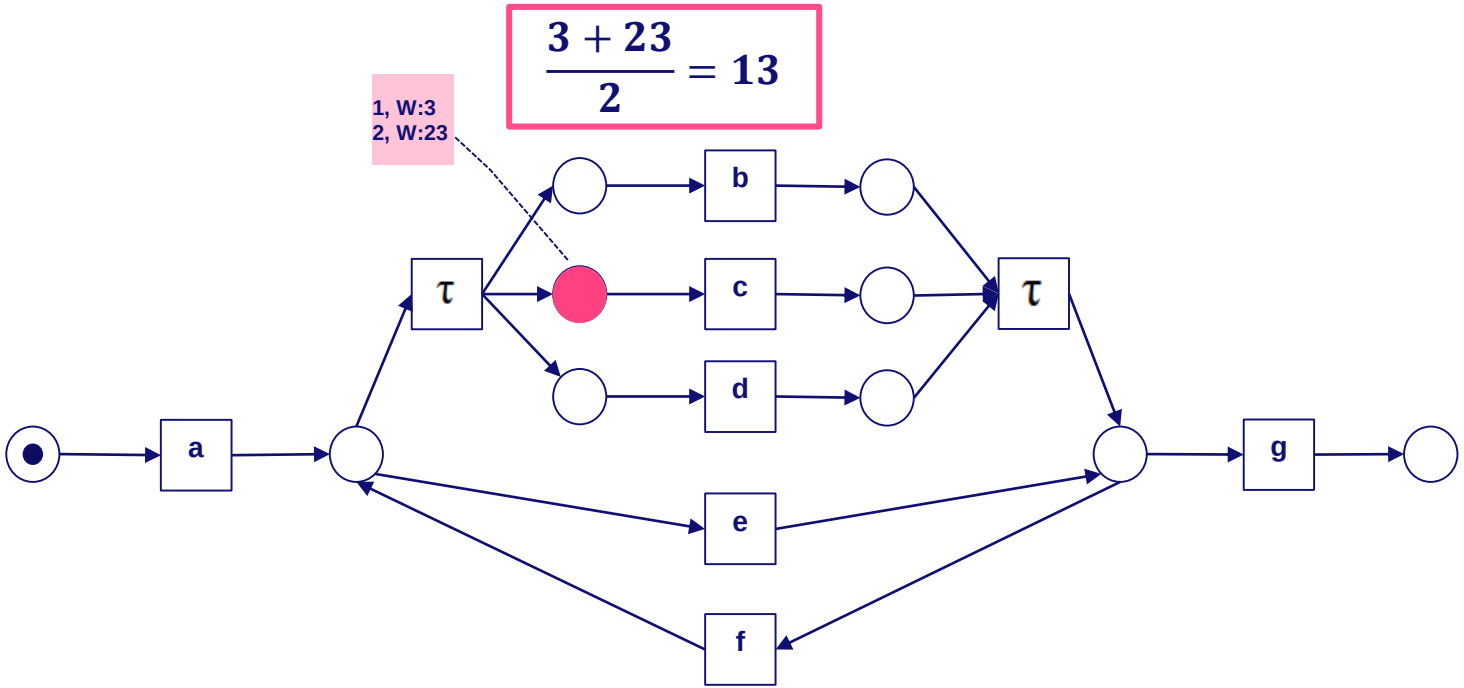
W: Waiting

Exercise 2 – Solution



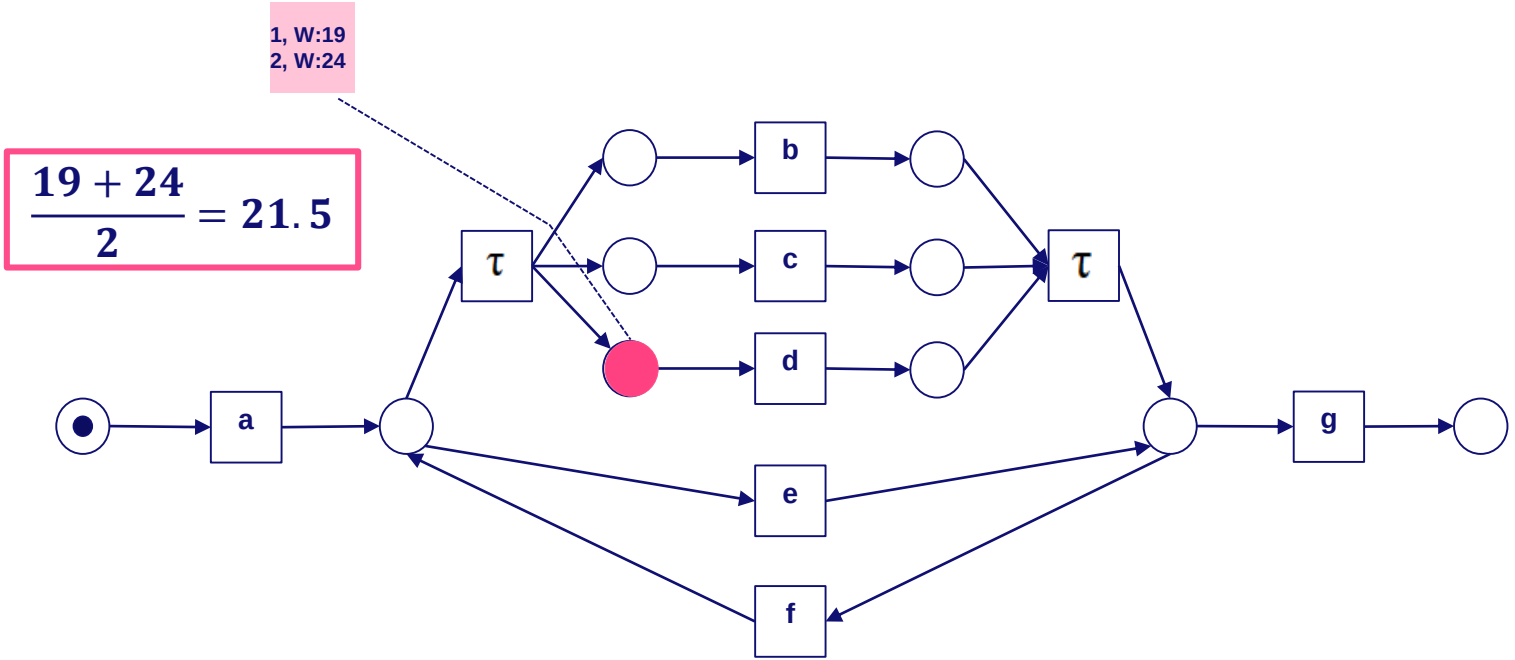
W: Waiting

Exercise 2 – Solution



W: Waiting

Exercise 2 – Solution



W: Waiting

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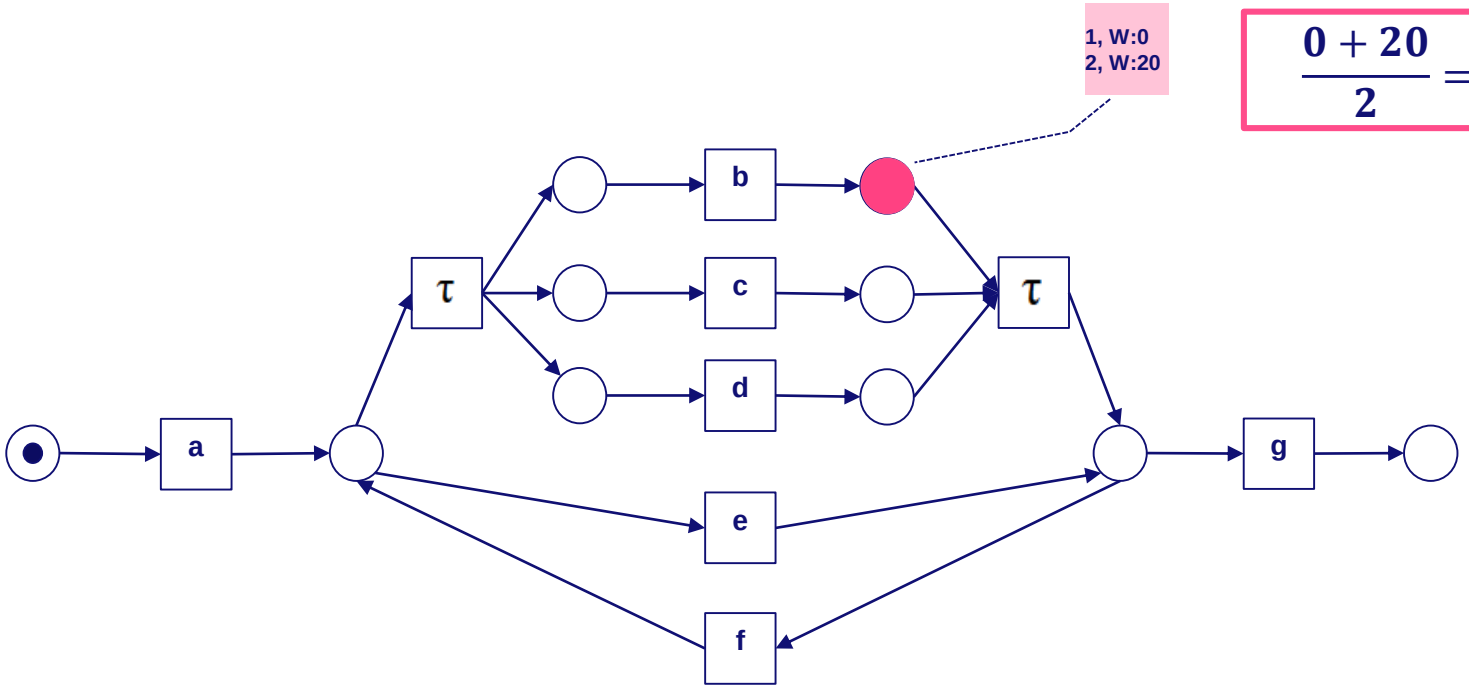
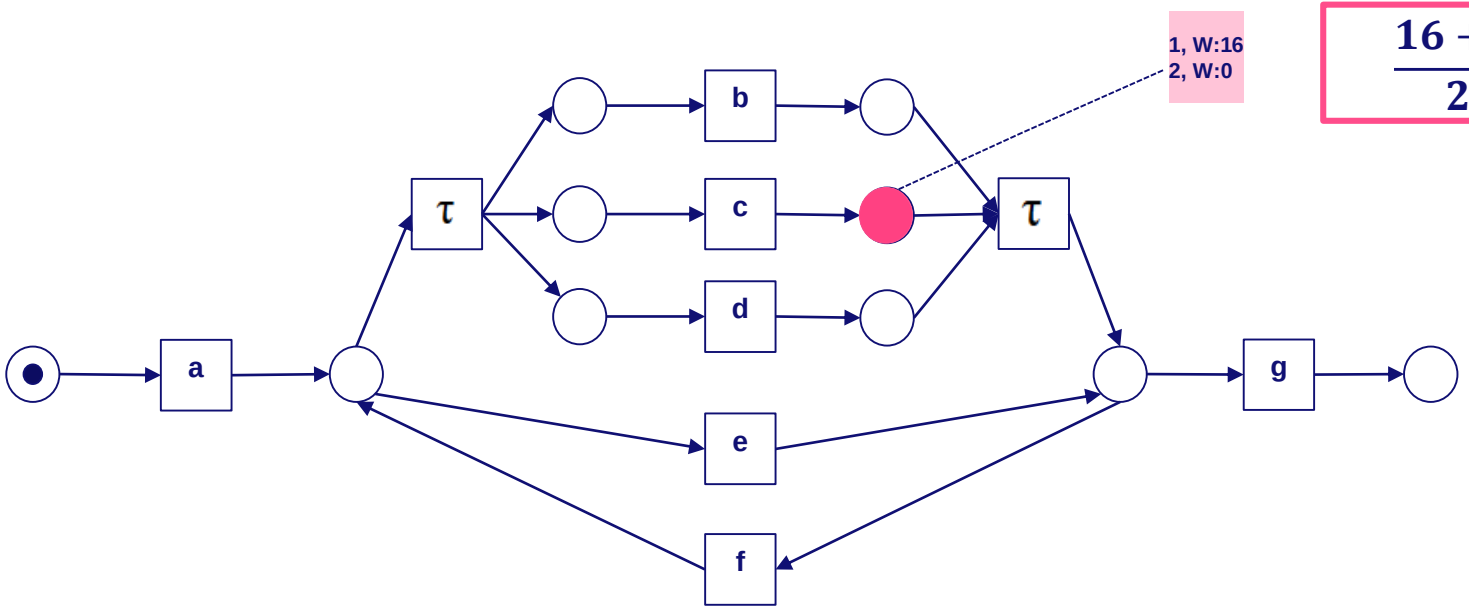
Exercise 2 – Solution



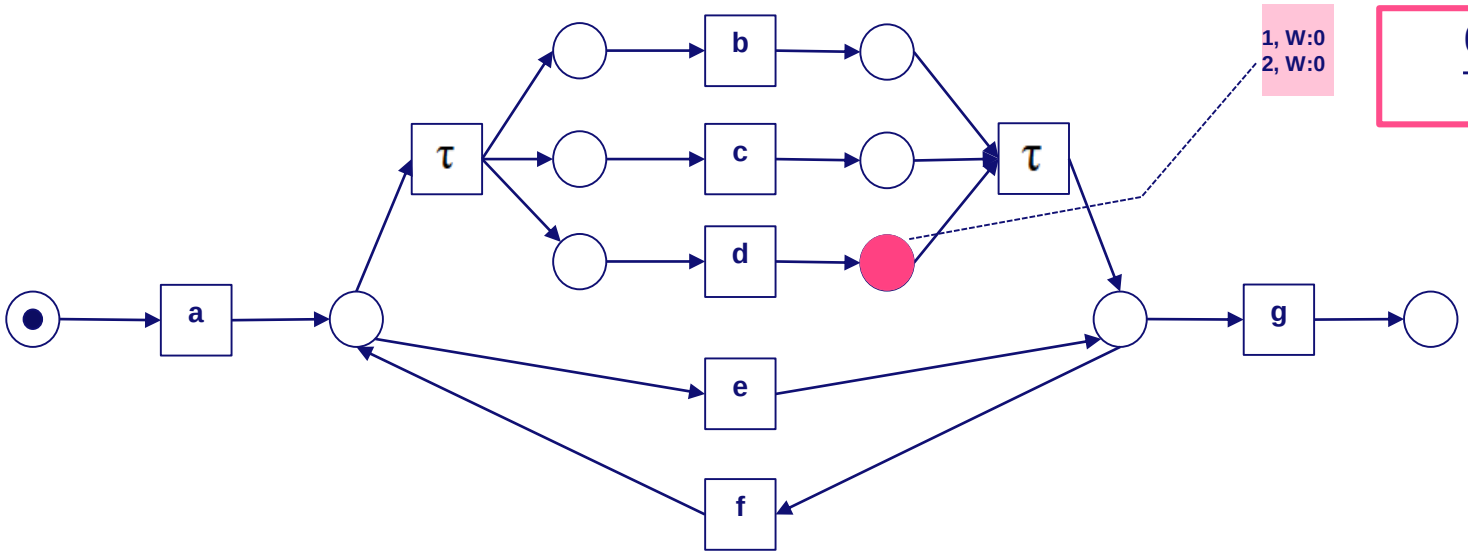
W: Waiting

Exercise 2 – Solution



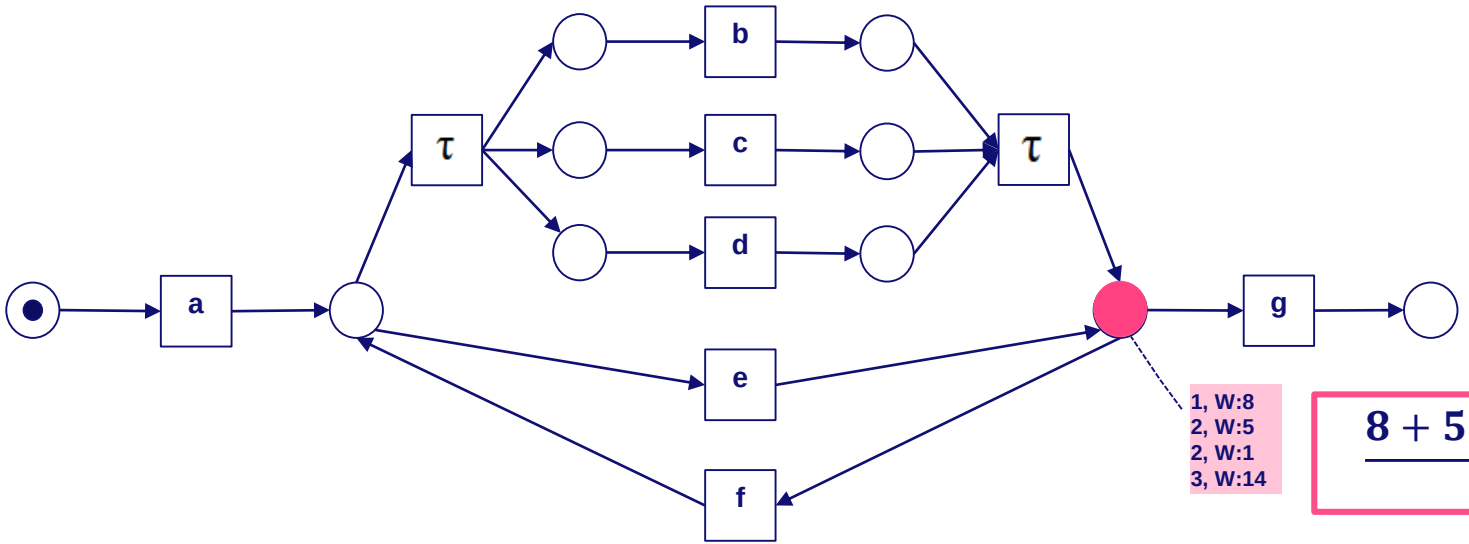
W: Waiting

Exercise 2 – Solution



W: Waiting

Exercise 2 – Solution



$$\frac{8+5+1+14}{4} = 7$$

W: Waiting

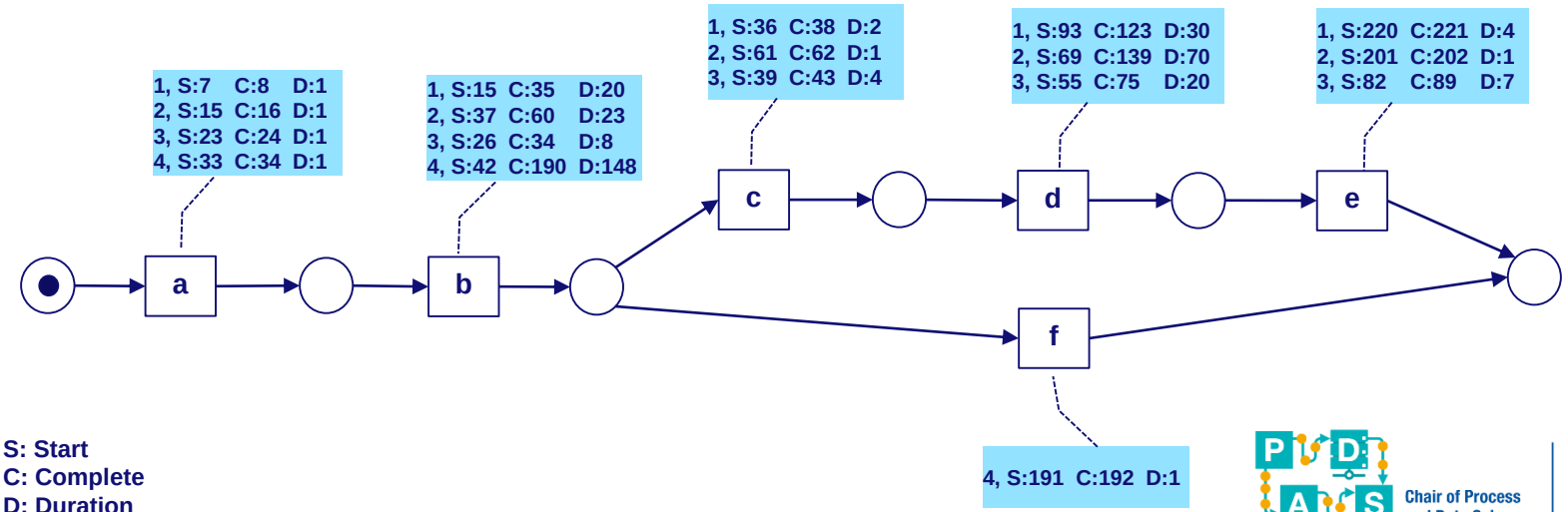
Exercise 3 (Performance)

Given the following process model and the service times:

a) Calculate the average waiting times.

b) Where is a possible bottleneck?

c) What is the average case duration?



S: Start
C: Complete
D: Duration

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Exercise 3 – Solution

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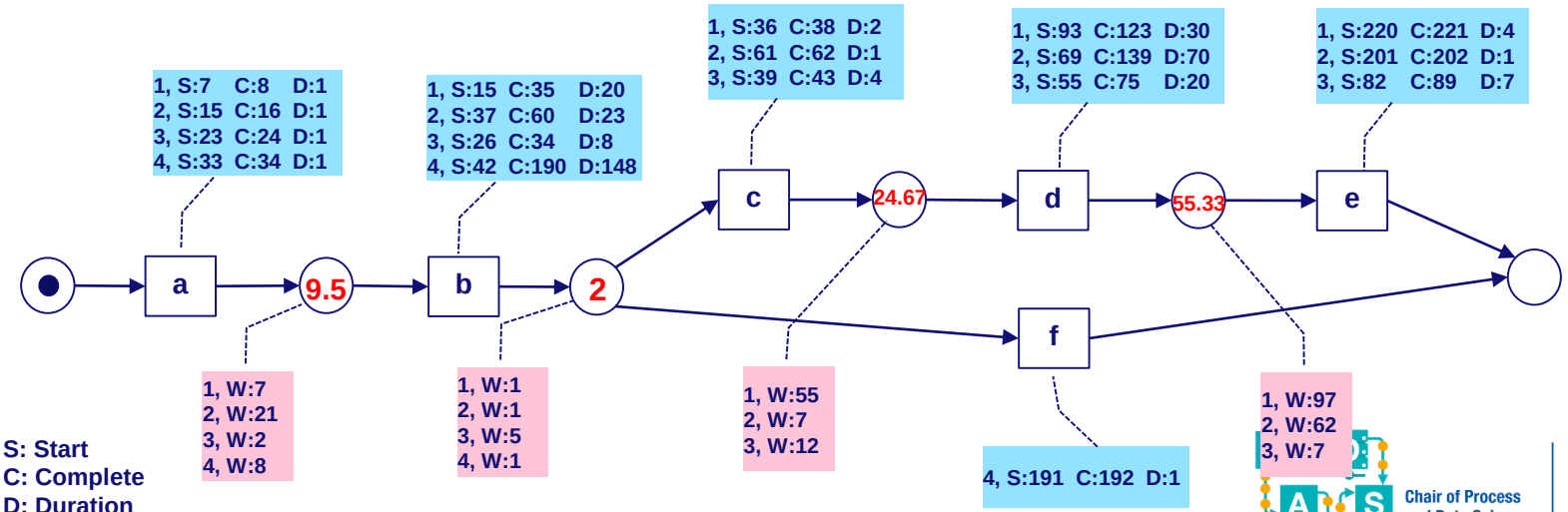

S: Start
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Exercise 3 – Solution

Given the following process model and the service times:

a) Calculate the average waiting times.

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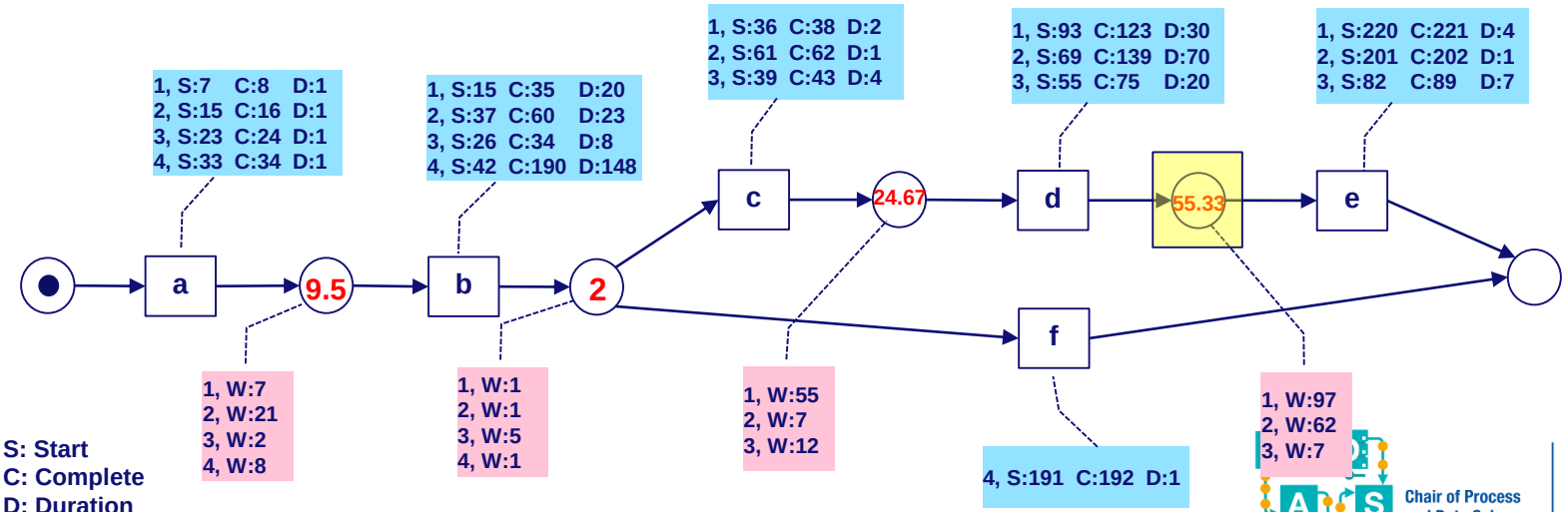

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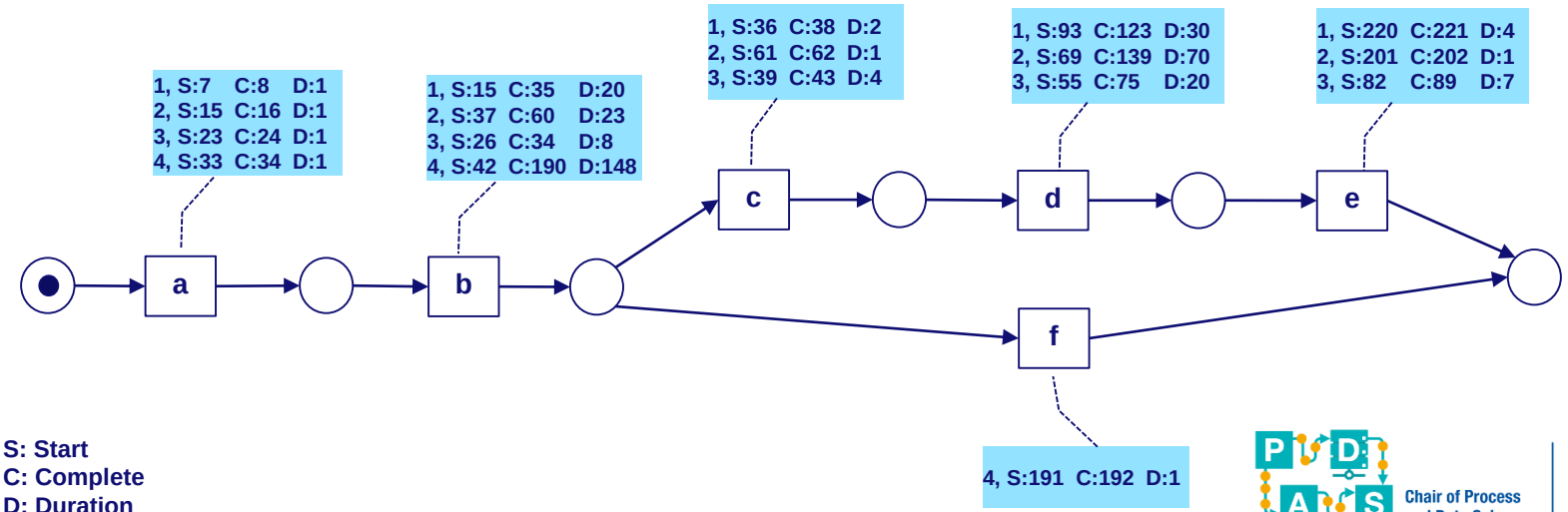

S: Start
C: Complete
D: Duration

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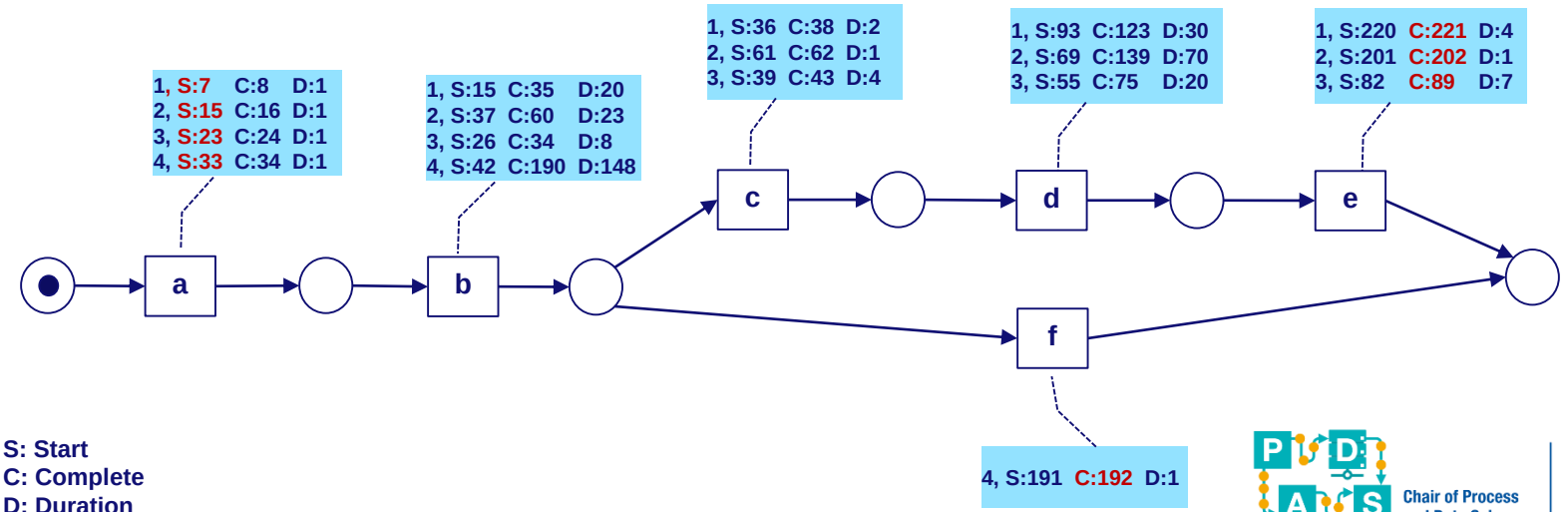
Exercise 3 – Solution

$Case\ 1: 221 - 7 = 214$
$Case\ 2: 202 - 15 = 187$
$Case\ 3: 89 - 23 = 66$
$Case\ 4: 192 - 33 = 159$

Average case duration is:

$$\frac{214+187+66+159}{4} = 156.5$$



S: Start
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D: Duration

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Performance analysis with Celonis
Data Integration (same as always)

- Upload the files “activity_table.csv” and “case_table.csv” into Celonis. Create a corresponding data model using the CASE ID to connect the activity table (“activity_table.csv”) and the case table (“case_table.csv”).
- Make sure you assign the case table as the “Case Table” of your “Activity Table”.
- Optional: Set aliases (e.g. “cases” for the case table and “events” for the activity table).
- Don’t forget to load the data model before you start your Analysis.
- Create a new analysis using the newly created data model.

PQL documentation: https://docs.celonis.com/en/pql-function-library.html

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next slide

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Performance analysis with Celonis

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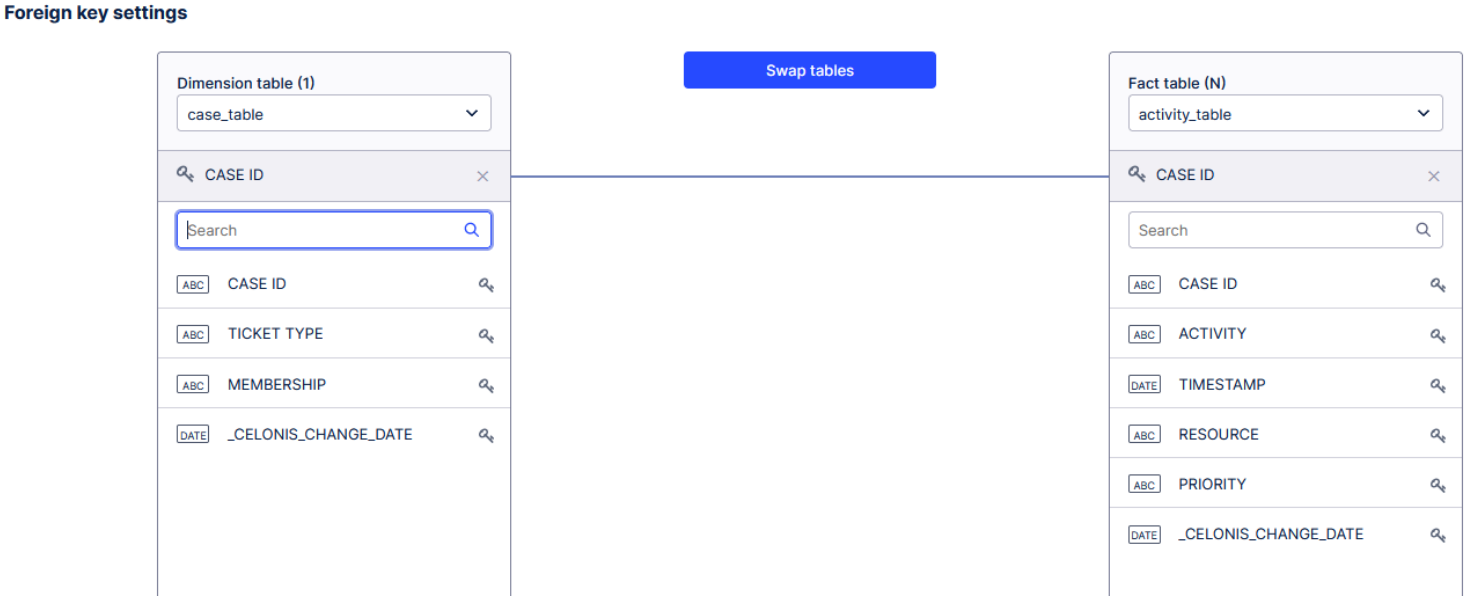

Remember that the activity table is the table on the N side of the relationship (1 case may have multiple events, each event belongs to one unique case).

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Performance analysis with Celonis
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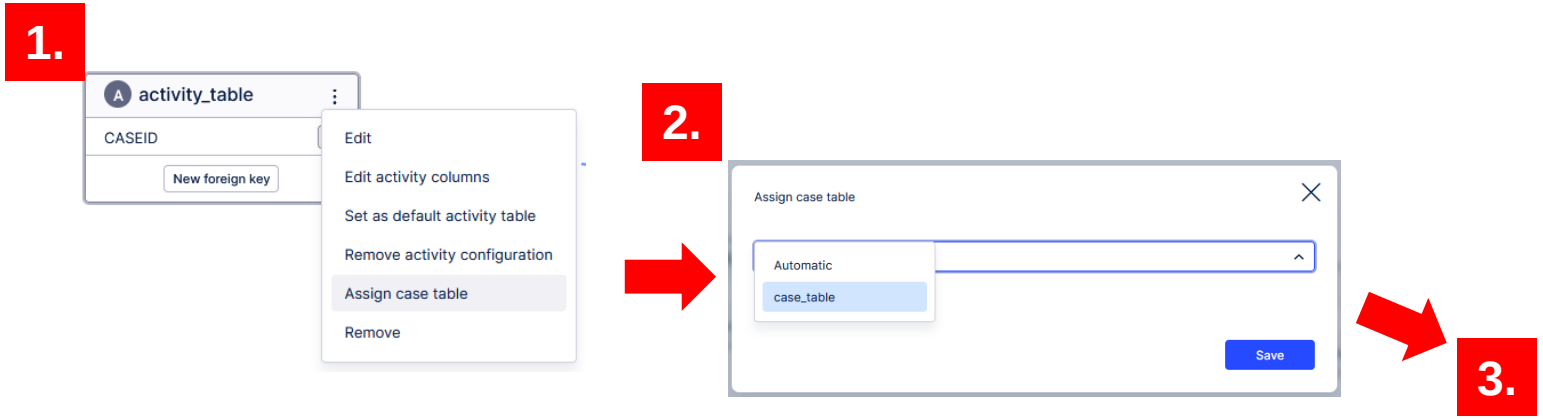
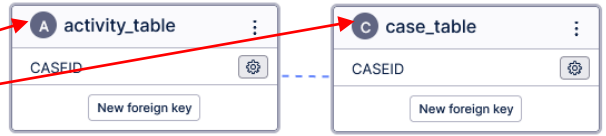


The icons A and C show that the tables have been identified correctly (necessary if you want to use predefined PQL queries.)



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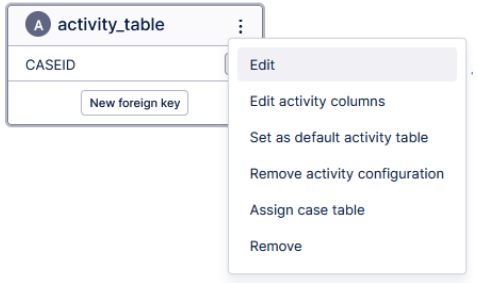
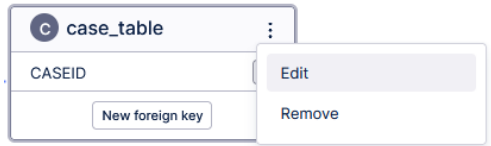
Performance analysis with Celonis

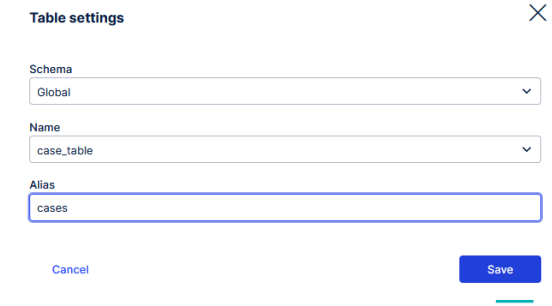
Data Integration (same as always)

1.



2.





Use of (shorter) aliases can make typing queries faster.

Task 1: Process Explorer configuration

a) Add a new sheet to your analysis and use the Process Explorer component to discover the DFG.

b) Move the sliders so that you can see 99% of all activities.

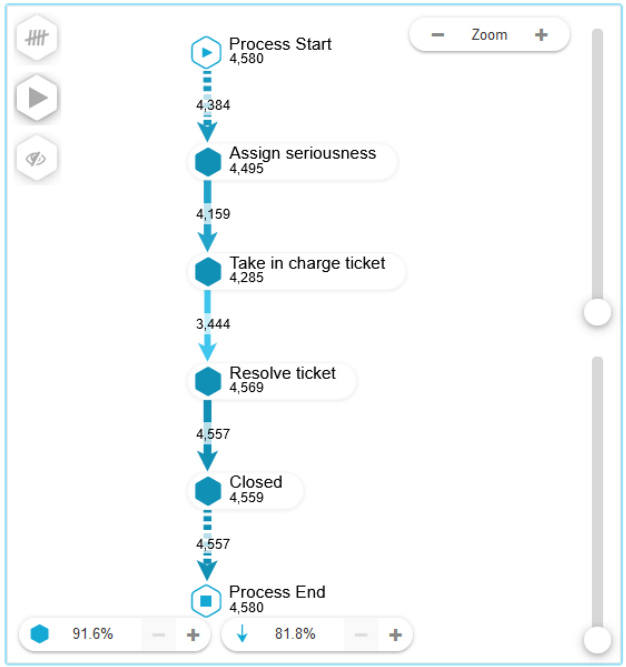
c) Adjust the configuration so that the arcs show the mean duration in hours.

d) In the component settings, change the color of the activity icons the following way: “Resolve ticket” should be green, “Wait” should be red, and “Take in charge ticket” should be yellow.

Task 1: Process Explorer configuration

a) Add a new sheet to your analysis and use the Process Explorer component to discover the DFG.

Result:



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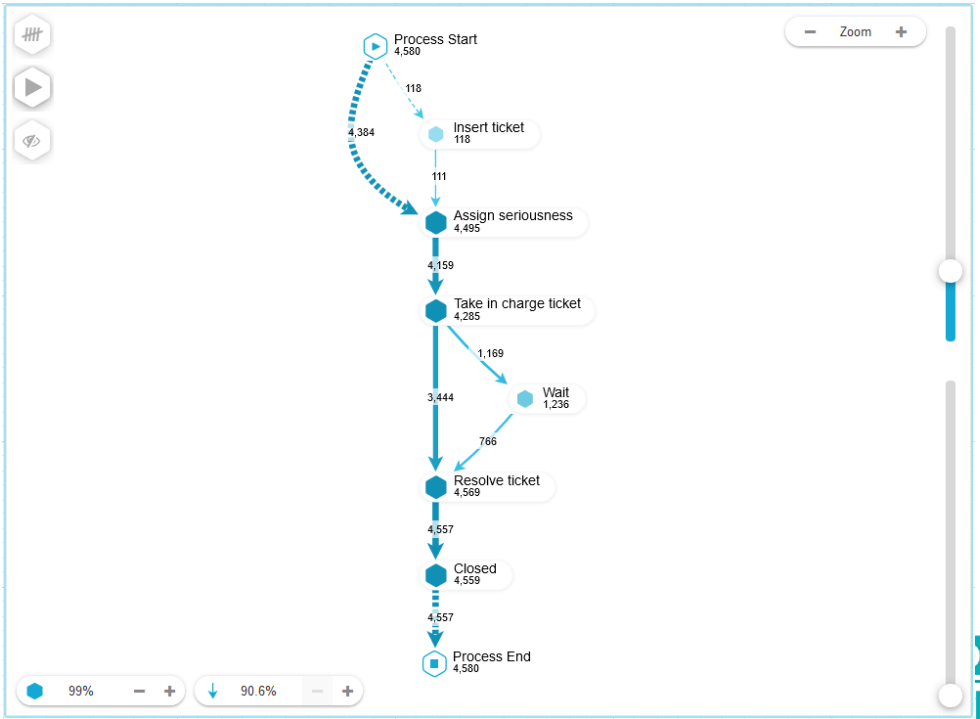
Task 1: Process Explorer configuration

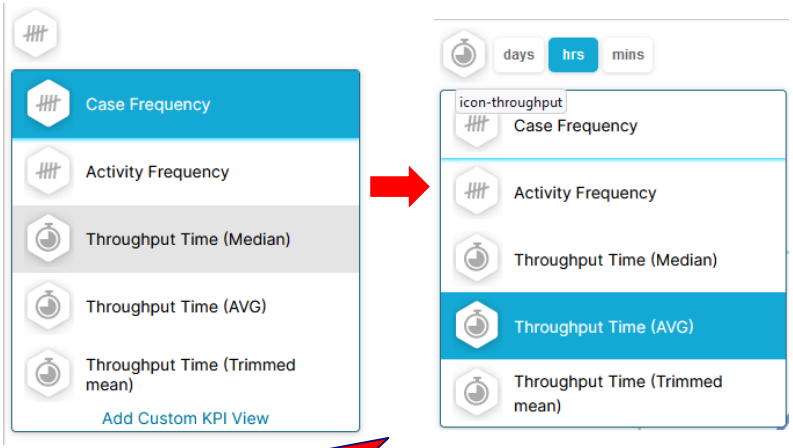
b) Move the sliders so that you can see 99% of all activities.

Result:



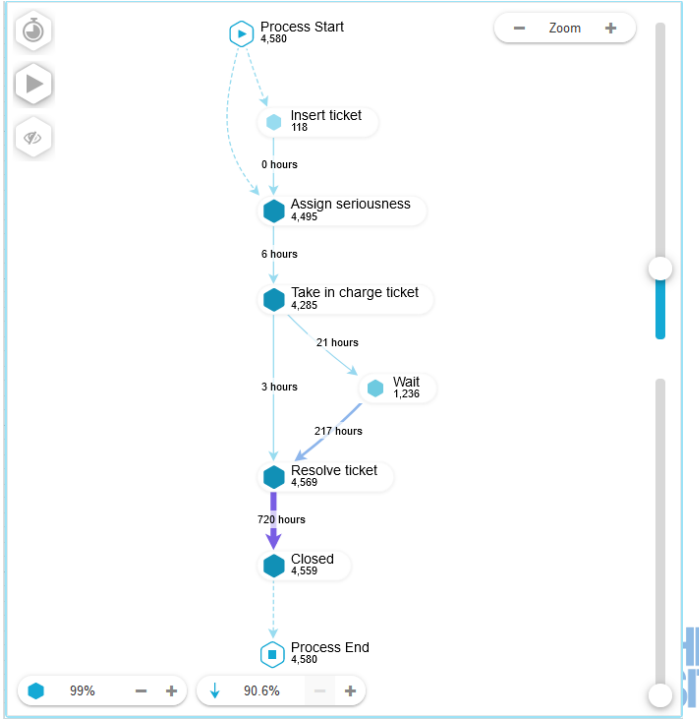
Task 1: Process Explorer configuration

c) Adjust the configuration so that the arcs show the mean duration in hours.



Top left corner of the Process Explorer component (by default you see the frequency of the arcs).

Result:



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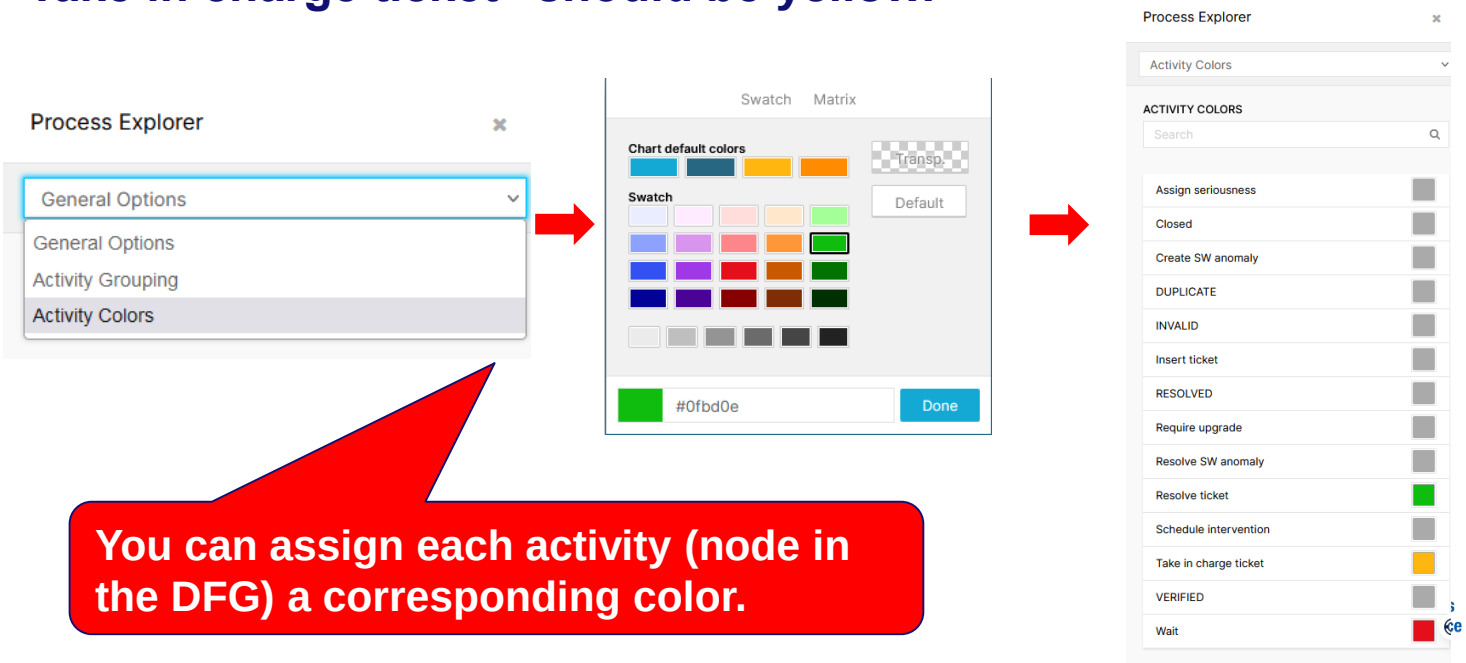
d) In the component settings, change the color of the activity icons the following way: “Resolve ticket” should be green, “Wait” should be red, and “Take in charge ticket” should be yellow.



You can assign each activity (node in the DFG) a corresponding color.

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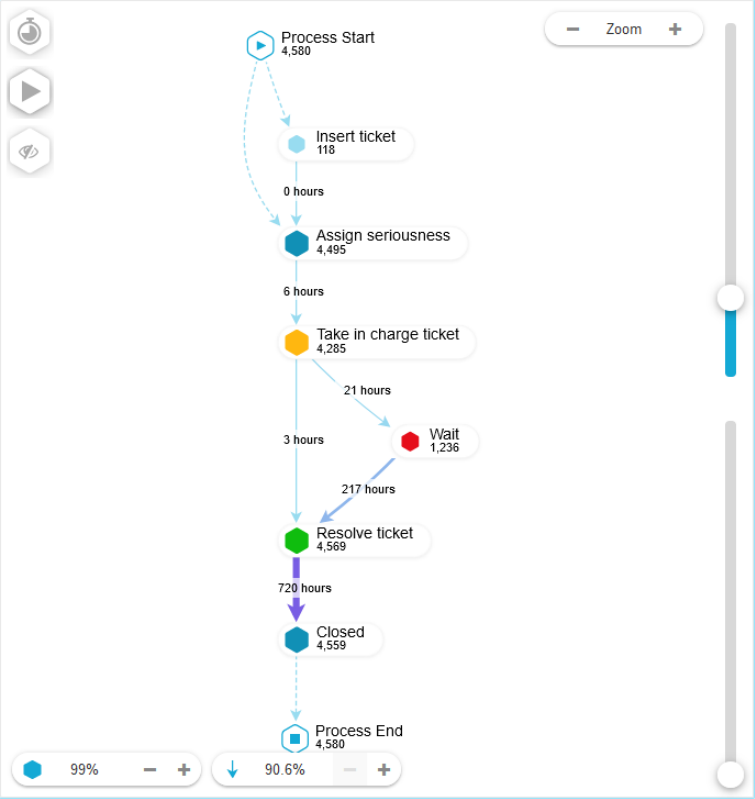
Task 1: Process Explorer configuration

d) Result:



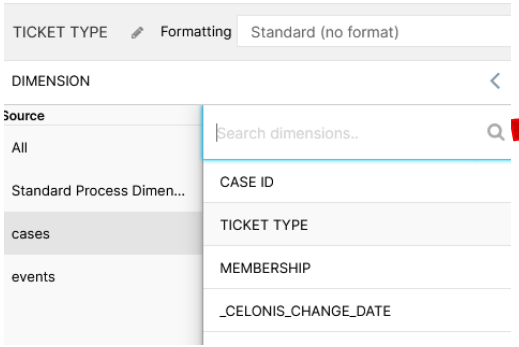
Task 2: Exploration

a) Using a Pie Chart component, visualize the distribution of the values for the case attribute Ticket type.
b) Using a Pie Chart component, visualize the distribution of the values for the case attribute Membership.
c) Using a Pie Chart component, visualize the distribution of the combined values for the case attributes Ticket type and Membership together.
d) Using a Histogram Chart component, visualize the number of occurrences for the throughput time in days. In the advanced options, select the Specific bucket count and set it to 10 (buckets). This will divide your values into 10 equal-width buckets.

Task 2: Exploration

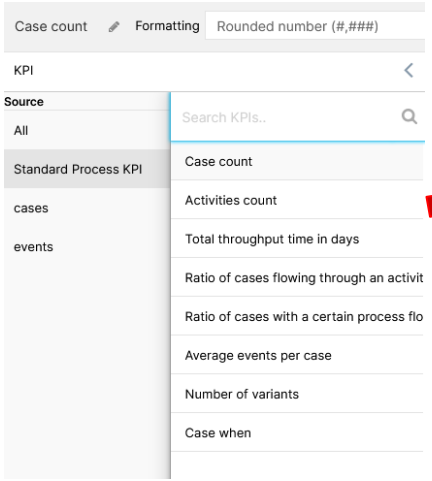
a) Using a Pie Chart component, visualize the distribution of the values for the case attribute Ticket type.

Dimension:



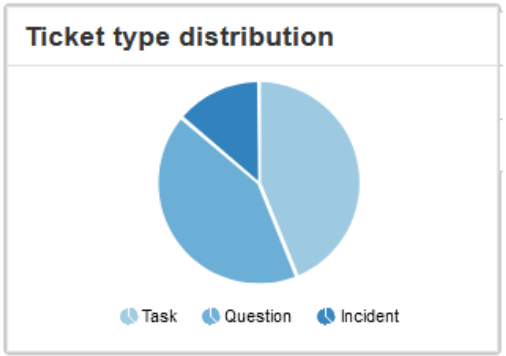

```
"cases"."TICKET TYPE"
```

KPI:




```
COUNT_TABLE("cases")
```

Result:



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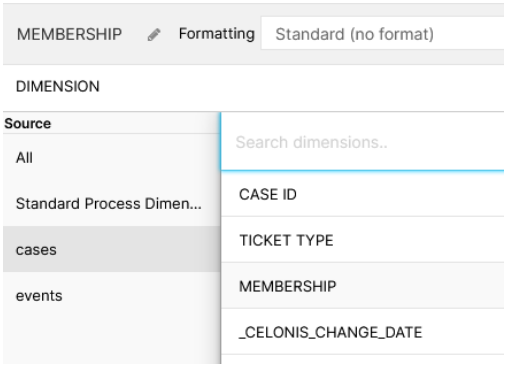
Task 2: Exploration

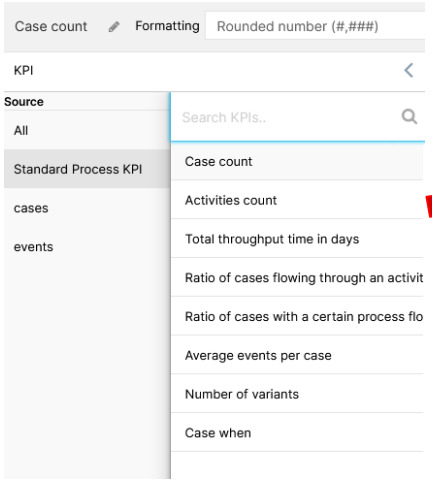
b) Using a Pie Chart component, visualize the distribution of the values for the case attribute Membership.

Dimension:



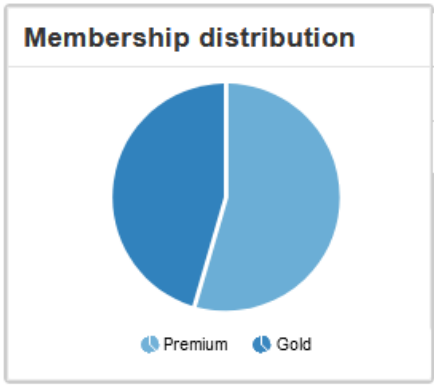

```
"cases"."MEMBERSHIP"
```

KPI:




```
COUNT_TABLE("cases")
```

Result:



Task 2: Exploration

c) Using a Pie Chart component, visualize the distribution of the combined values for the case attributes Ticket type and Membership together.

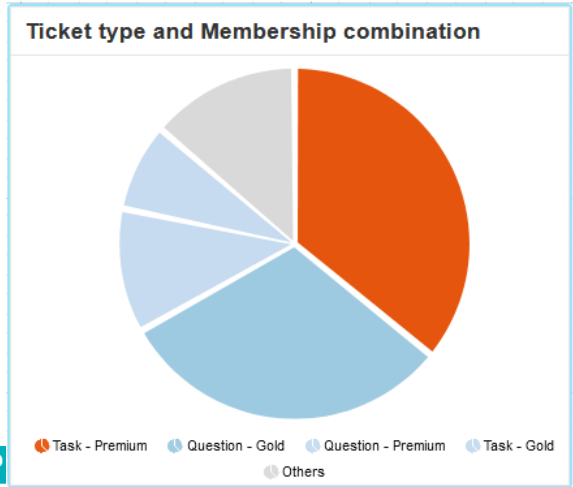
Dimension(s):

```
"cases"."TICKET TYPE"
"cases"."MEMBERSHIP"
```

KPI:

```
COUNT_TABLE("cases")
```

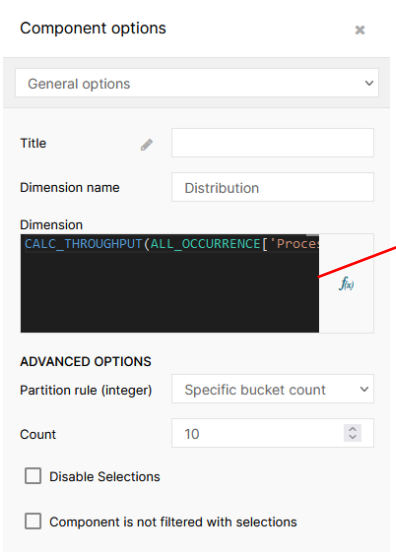
Result:

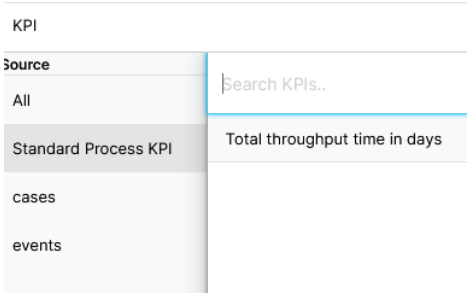


Task 2: Exploration

d) Using a Histogram Chart component, visualize the number of occurrences for the throughput time in days. In the advanced options, select the Specific bucket count and set it to 10 (buckets). This will divide your values into 10 equal-width buckets.

Dimension:

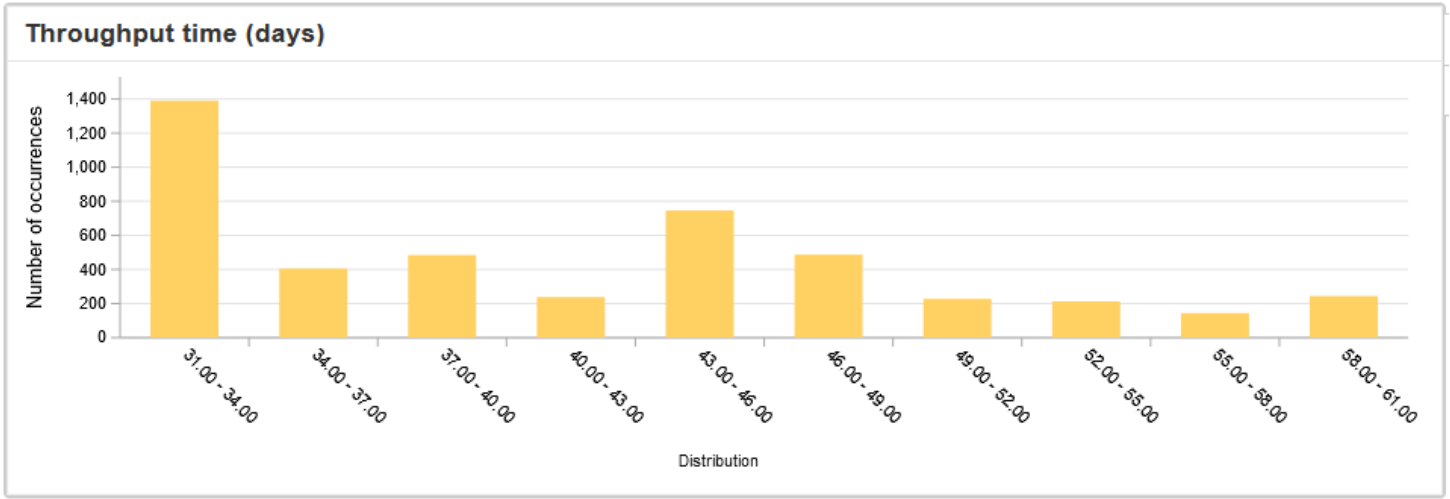




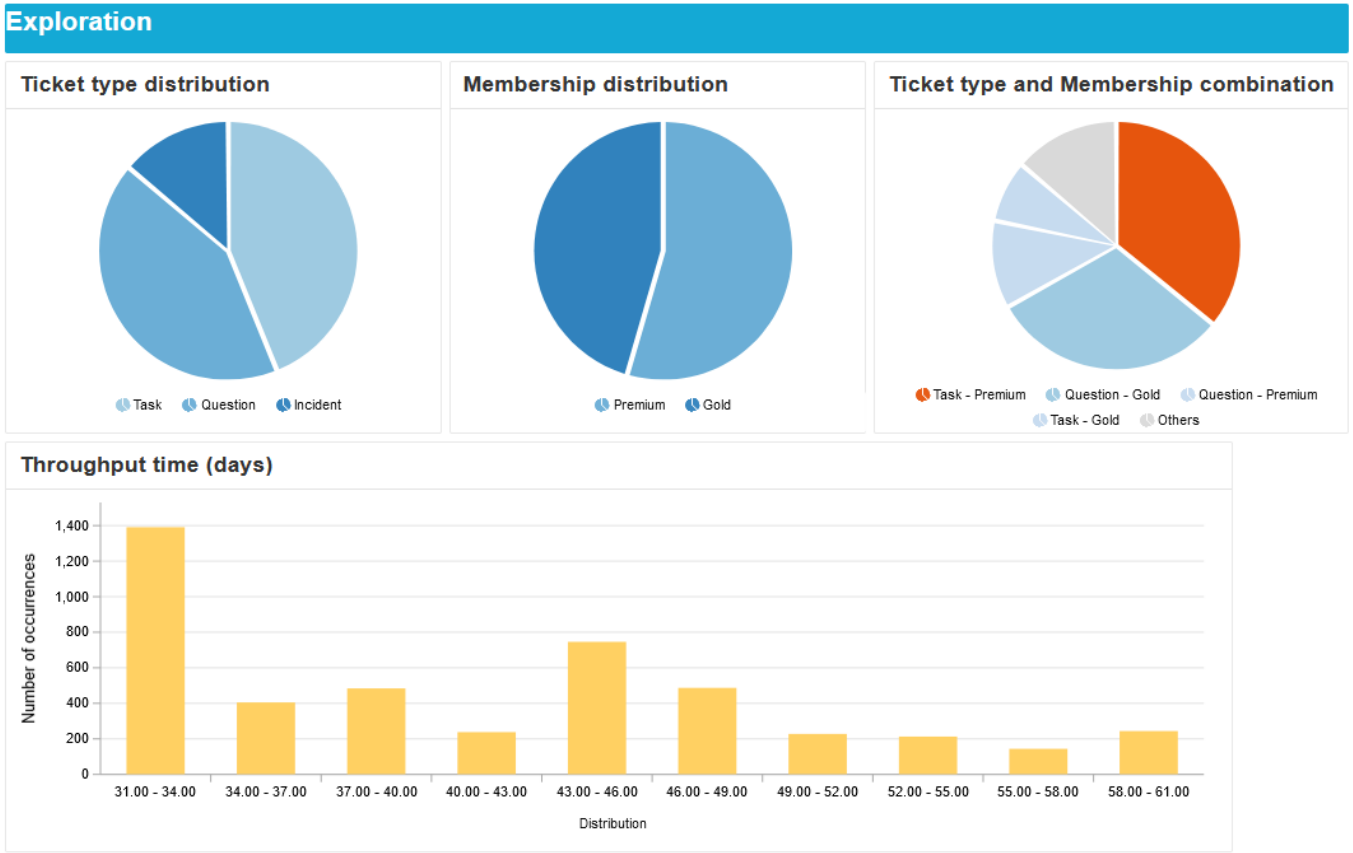

```
ALC_THROUGHPUT(ALL_OCCURRENCE['Process Start']
TO ALL_OCCURRENCE['Process End'],
REMAP_TIMESTAMPS("events"."TIMESTAMP", DAYS))
```

Task 2: Exploration

d) Result:



Task 2: Exploration
How your dashboard could look like



For the assignment: Always give your components a title!

Task 3:Throughput times (case-level)

a) Create two Single KPI components of type Number. One of them must compute the 0.3 Quantile value of the throughput times in days. The other one must compute the 0.7 Quantile value of the throughput times in days. Provide a screenshot of both components.

Task 3:Throughput times (case-level)

a) Create two Single KPI components of type Number. One of them must compute the 0.3 Quantile value of the throughput times in days. The other one must compute the 0.7 Quantile value of the throughput times in days. Provide a screenshot of both components.

KPI:

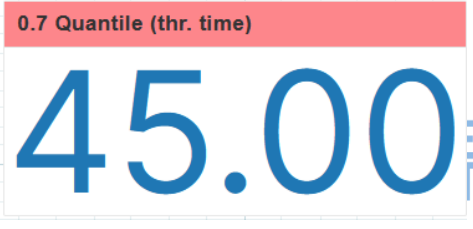
```
QUANTILE(CALC_THROUGHPUT(ALL_OCCURRENCE['Process
Start'] TO ALL_OCCURRENCE['Process End'],
REMAP_TIMESTAMPS("events"."TIMESTAMP", DAYS)), 0.3)
```

Result:

KPI:

```
QUANTILE(CALC_THROUGHPUT(ALL_OCCURRENCE['Process
Start'] TO ALL_OCCURRENCE['Process End'],
REMAP_TIMESTAMPS("events"."TIMESTAMP", DAYS)), 0.7)
```

Result:



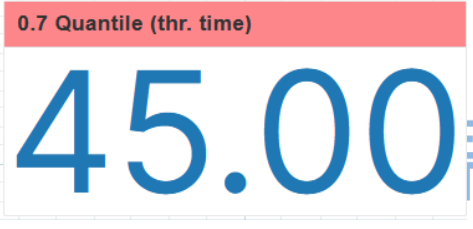
Task 3:Throughput times (case-level)

a) Create two Single KPI components of type Number. One of them must compute the 0.3 Quantile value of the throughput times in days. The other one must compute the 0.7 Quantile value of the throughput times in days. Provide a screenshot of both components.

Result:

Interpretation:
30% of cases finish in 33 days or less.
70% of cases finish in 45 days or less
(30% take longer than 45 days).

Result:



Task 3:Throughput times (case-level)

b) Create a case-based situation table containing the following columns:

1. **Case identifier**
2. **Case ticket type**
3. **Case membership**
4. **Decision (*Wait* or *No Wait*): *Wait* if the case contains activity Wait at least once and *No Wait* otherwise.**
5. **Last priority: Priority is an event attribute which is set every time activity “Assign seriousness” occurs. Here, the last Priority value of each case is needed.**
6. **Throughput time category (*slow*, *normal*, or *fast*): If the throughput time (in days) is lower than the 0.3 quantile, the value must be set to *fast*. If the throughput time (in days) is higher than or equal to the 0.7 quantile, the value must be set to *slow*. Otherwise, the value must be set to *normal*.**

Task 3:Throughput times (case-level)

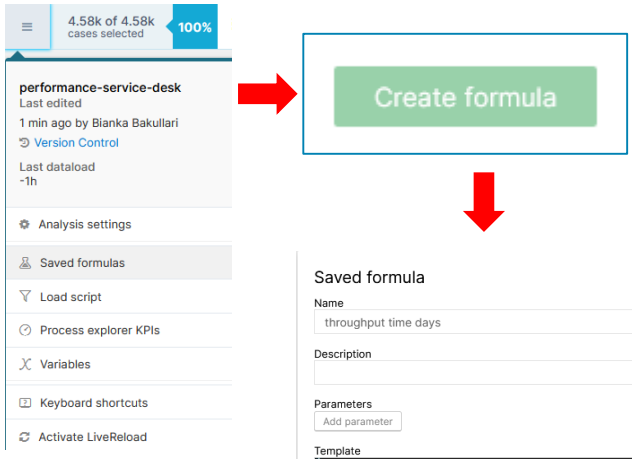
1. **Case identifier** `"cases"."CASE ID"`
2. **Case ticket type** `"cases"."TICKET TYPE"`
3. **Case membership** `"cases"."MEMBERSHIP"`
4. **Decision (*Wait* or *No Wait*):**

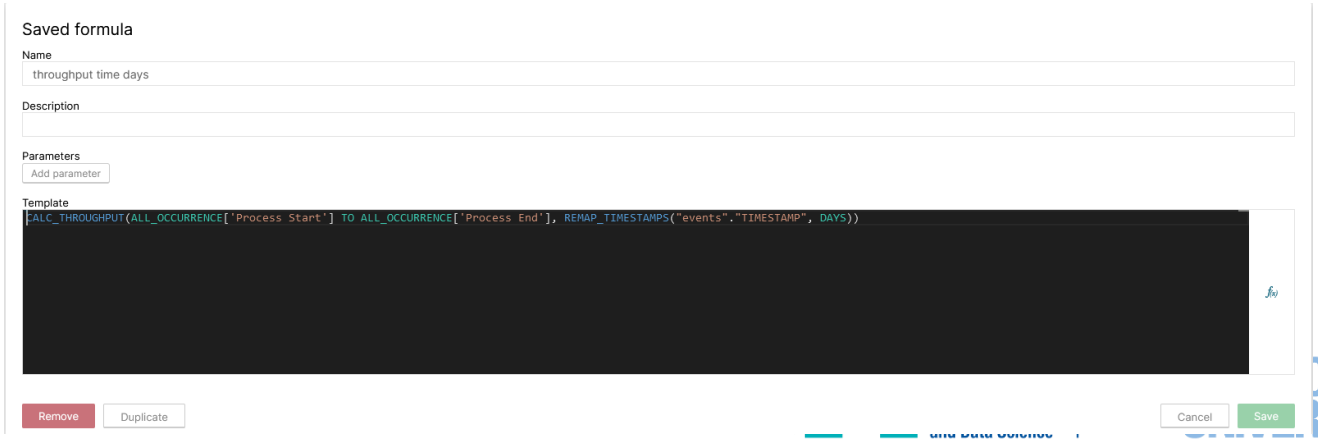
```
CASE WHEN PROCESS EQUALS 'Wait'
THEN 'Wait'
ELSE 'No Wait'
END
```

5. **Last priority:** `PU_LAST("cases", "events"."PRIORITY")`

Task 3:Throughput times (case-level)

6. Throughput time category:





To avoid retyping:
We save the formula for the throughput time (days) computation under the name “throughput time days”.

Task 3:Throughput times (case-level)

5. Throughput time category:

```
CASE WHEN KPI("throughput time days") < 33
THEN 'fast'
WHEN KPI("throughput time days") < 45
THEN 'normal'
ELSE 'slow'
END
```

This is the formula we saved.

Task 3:Throughput times (case-level)

For the assignment: Always give your Columns a label!

b) Result:

Case-based table

1. CASE ID	2. TICKET TYPE	3. MEMBERSHIP	4. Decision Wait	5. Last priority	6. throughput ti...
Case 1	Question	Gold	No Wait	Normal	fast
Case 10	Task	Premium	No Wait	Normal	slow
Case 100	Task	Premium	No Wait	Normal	slow
Case 1000	Incident	Gold	No Wait	Urgent	normal
Case 1001	Task	Premium	No Wait	Normal	normal
Case 1002	Task	Gold	No Wait	High	fast
Case 1003	Task	Premium	No Wait	Normal	normal
Case 1004	Incident	Premium	No Wait	Normal	fast
Case 1005	Task	Premium	No Wait	Normal	slow
Case 1006	Question	Gold	No Wait	High	slow
Case 1007	Task	Premium	No Wait	Normal	slow
Case 1008	Task	Gold	No Wait	High	normal
Case 1009	Task	Premium	Wait	High	normal
Case 101	Question	Premium	No Wait	Normal	slow
Case 1010	Task	Premium	No Wait	Normal	normal
Case 1011	Question	Gold	No Wait	Normal	slow

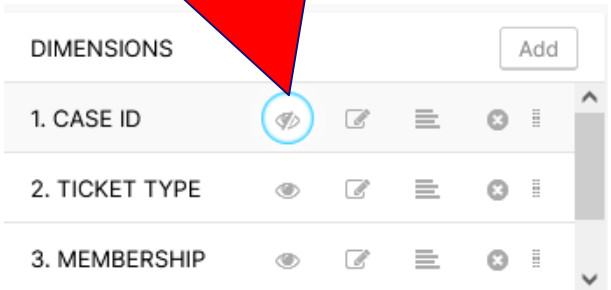
Task 3:Throughput times (case-level)

c) Remove the case id (column 1) and export the table. Import it into RapidMiner and discover a decision tree using “Throughput time category” (column 6) as response variable (label).

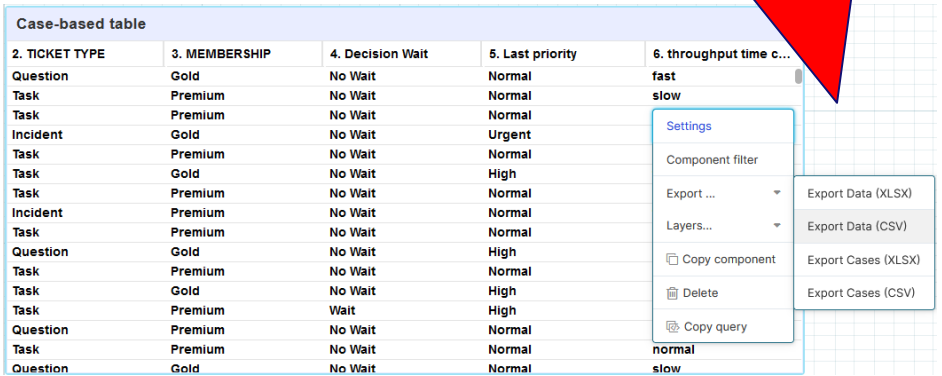
Task 3:Throughput times (case-level)

c) Remove the case id (column 1) and export the table. Import it into RapidMiner and discover a decision tree using “Throughput time category” (column 6) as response variable (label).

Removing the CASE ID column.



Exporting the table.



Chair of Process and Data Science

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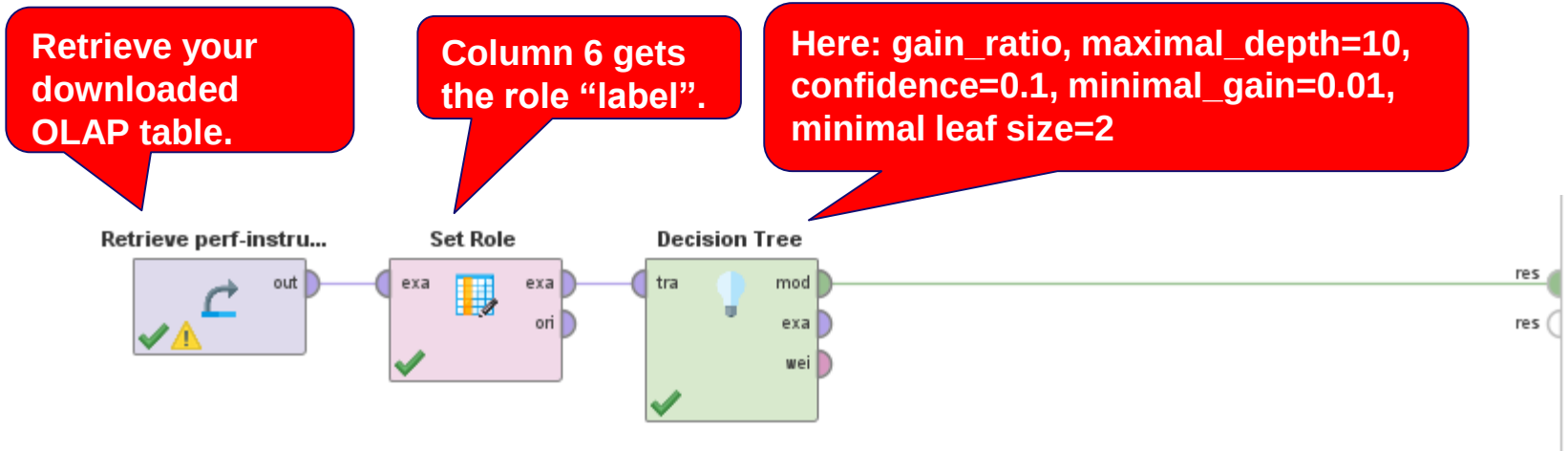
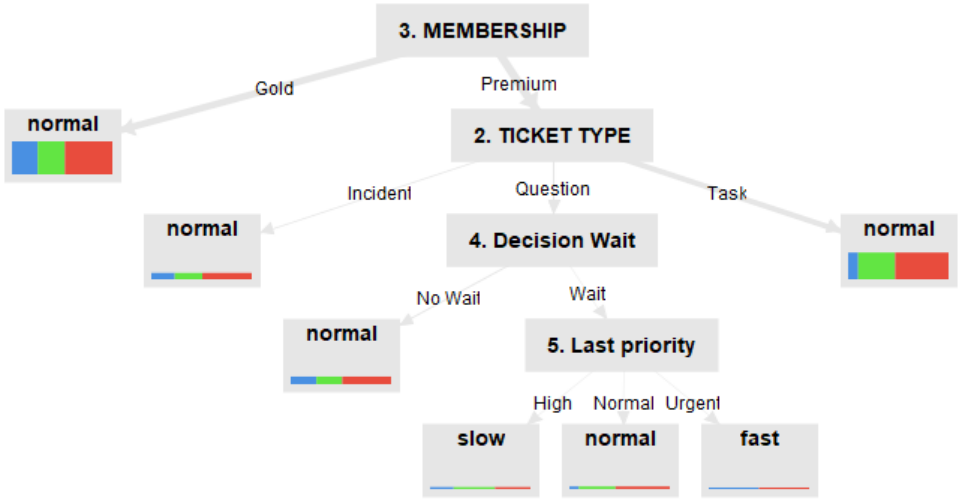
Task 3:Throughput times (case-level)

c) Remove the case id (column 1) and export the table. Import it into RapidMiner and discover a decision tree using “Throughput time category” (column 6) as response variable (label).



Task 3:Throughput times (case-level)

c) Result:



Task 4:Throughput times (event-pair-level)

a) Create an event-pair-based situation table containing the following columns:

1. **Case identifier**
2. **Case ticket type**
3. **Case membership**
4. **Source activity**
5. **Target activity**
6. **Source resource**
7. **Target resource**
8. **Waiting time between source and target event in *hours***

Task 4:Throughput times (event-pair-level)

1. **Case identifier** `"cases"."CASE ID"`
2. **Case ticket type** `"cases"."TICKET TYPE"`
3. **Case membership** `"cases"."MEMBERSHIP"`
4. **Source activity** `SOURCE("events"."ACTIVITY")`
5. **Target activity** `TARGET("events"."ACTIVITY")`

Task 4:Throughput times (event-pair-level)

6. **Source resource** `SOURCE("events"."RESOURCE")`
7. **Target resource** `TARGET("events"."RESOURCE")`
8. **Waiting time between source and target event in *hours***

```
HOURS_BETWEEN(
SOURCE("events"."TIMESTAMP"),
TARGET("events"."TIMESTAMP"))
```

Task 4:Throughput times (event-pair-level)

a) Result:

1. CASE ID	2. TICKET TYPE	3. MEMBERSHIP	4. Source activ...	5. Target activity	6. Source reso...	7. Target resou...	8. waiting time ...
Case 1	Question	Gold	Assign serious...	Take in charge ...	Res4	Res8	0.0122222222...
Case 1	Question	Gold	Take in charge ...	Take in charge ...	Res8	Res3	72.198611111...
Case 1	Question	Gold	Take in charge ...	Resolve ticket	Res3	Res4	308.85833333...
Case 1	Question	Gold	Resolve ticket	Closed	Res4	Res2	361.00361111...
Case 10	Task	Premium	Assign serious...	Take in charge ...	Res4	Res6	887.94611111...
Case 10	Task	Premium	Take in charge ...	Resolve ticket	Res6	Res4	0.0019444444...
Case 10	Task	Premium	Resolve ticket	Closed	Res4	Res1	359.00694444...
Case 100	Task	Premium	Assign serious...	Take in charge ...	Res3	Res5	287.97888888...
Case 100	Task	Premium	Take in charge ...	Require upgrade	Res5	Res2	5.4527777777...
Case 100	Task	Premium	Require upgrade	Resolve ticket	Res2	Res8	501.49694444...
Case 100	Task	Premium	Resolve ticket	Closed	Res8	Res2	360.00555555...
Case 1000	Incident	Gold	Assign serious...	Assign serious...	Res8	Res8	0.0016666666...
Case 1000	Incident	Gold	Assign serious...	Take in charge ...	Res8	Res4	0.0016666666...
Case 1000	Incident	Gold	Take in charge ...	Resolve ticket	Res4	Res4	125.22027777...
Case 1000	Incident	Gold	Resolve ticket	Closed	Res4	Res2	930.90111111...
Case 1001	Task	Premium	Assign serious...	Take in charge ...	Res4	Res5	399.11916666...

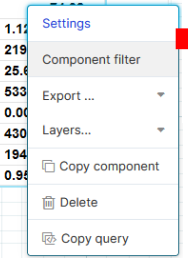
Task 4:Throughput times (event-pair-level)

b) We are only interested in event pairs corresponding to pairs of activities: “Take in charge ticket” and “Resolve ticket”. Apply the necessary filter to your OLAP table from a). Show the table after applying the filter.

Task 4:Throughput times (event-pair-level)

b) Filter:

CASE ID	TICKET TYPE	MEMBERSHIP	Source acti...	Target activ...	Source res...	Target reso...	waiting tim...
Case 1	Question	Gold	Take in char...	Resolve tic...	Res3	Res4	308.85833...
Case 10	Task	Premium	Take in char...	Resolve tic...	Res6	Res4	0.0019444...
Case 1000	Incident	Gold	Take in char...	Resolve tic...	Res4	Res4	125.22027...
Case 1001	Task	Premium	Take in char...	Resolve tic...	Res5	Res3	
Case 1002	Task	Gold	Take in char...	Resolve tic...	Res5	Res3	1.12
Case 1003	Task	Premium	Take in char...	Resolve tic...	Res6	Res3	219
Case 1004	Incident	Premium	Take in char...	Resolve tic...	Res5	Res3	25.6
Case 1005	Task	Premium	Take in char...	Resolve tic...	Res5	Res3	533
Case 1006	Question	Gold	Take in char...	Resolve tic...	Res6	Res3	0.0
Case 1007	Task	Premium	Take in char...	Resolve tic...	Res5	Res4	430
Case 1008	Task	Gold	Take in char...	Resolve tic...	Res7	Res3	194
Case 101	Question	Premium	Take in char...	Resolve tic...	Res7	Res8	0.95



Load script

```
1  FILTER SOURCE("events"."ACTIVITY") = 'Take in charge ticket' AND TARGET("events"."ACTIVITY") = 'Resolve ticket'
```

```
FILTER SOURCE("events"."ACTIVITY")='Take in charge ticket' AND
TARGET("events"."ACTIVITY")='Resolve ticket'
```

Task 4:Throughput times (event-pair-level)

b) Result:

1. CASE ID	2. TICKET TYPE	3. MEMBERSHIP	4. Source activ...	5. Target activity	6. Source reso...	7. Target resou...	8. waiting time ...
Case 1	Question	Gold	Take in charge ...	Resolve ticket	Res3	Res4	308.85833333...
Case 10	Task	Premium	Take in charge ...	Resolve ticket	Res6	Res4	0.0019444444...
Case 1000	Incident	Gold	Take in charge ...	Resolve ticket	Res4	Res4	125.22027777...
Case 1001	Task	Premium	Take in charge ...	Resolve ticket	Res5	Res3	74.38
Case 1002	Task	Gold	Take in charge ...	Resolve ticket	Res5	Res3	1.1277777777...
Case 1003	Task	Premium	Take in charge ...	Resolve ticket	Res6	Res3	219.05361111...
Case 1004	Incident	Premium	Take in charge ...	Resolve ticket	Res5	Res3	25.615833333...
Case 1005	Task	Premium	Take in charge ...	Resolve ticket	Res5	Res3	533.62388888...
Case 1006	Question	Gold	Take in charge ...	Resolve ticket	Res6	Res3	0.0022222222...
Case 1007	Task	Premium	Take in charge ...	Resolve ticket	Res5	Res4	430.22472222...
Case 1008	Task	Gold	Take in charge ...	Resolve ticket	Res7	Res3	194.29138888...
Case 101	Question	Premium	Take in charge ...	Resolve ticket	Res7	Res8	0.9555555555...
Case 1011	Question	Gold	Take in charge ...	Resolve ticket	Res7	Res8	0.1844444444...
Case 1012	Incident	Premium	Take in charge ...	Resolve ticket	Res3	Res8	0.01
Case 1014	Task	Premium	Take in charge ...	Resolve ticket	Res4	Res4	0.0372222222...
Case 1015	Incident	Gold	Take in charge ...	Resolve ticket	Res7	Res8	115.32027777...

Task 4:Throughput times (event-pair-level)

c) Add another column (column 9) to your table and name it “Waiting time category”. If the waiting time in hours before the source and the target event is lower than 3, the value should be *short*. Otherwise, the value should be *long*.

Task 4:Throughput times (event-pair-level)

c) Add another column (column 9) to your table and name it “Waiting time category”. If the waiting time in hours before the source and the target event is lower than 3, the value should be *short*. Otherwise, the value should be *long*.

9. Waiting time category

```
CASE WHEN HOURS_BETWEEN(
SOURCE("events"."TIMESTAMP"),
TARGET("events"."TIMESTAMP")) < 3
THEN 'short'
ELSE 'long'
END
```

Task 4:Throughput times (event-pair-level)

c) Result:

1. CASE ID	2. TICKET TYPE	3. MEMBERSHIP	4. Source activity	5. Target activity	6. Source resource	7. Target resource	8. waiting time (h...	9. Waiting time ca...
Case 1	Question	Gold	Take in charge tic...	Resolve ticket	Res3	Res4	308.858333333333...	long
Case 10	Task	Premium	Take in charge tic...	Resolve ticket	Res6	Res4	0.00194444444444...	short
Case 1000	Incident	Gold	Take in charge tic...	Resolve ticket	Res4	Res4	125.220277777777...	long
Case 1001	Task	Premium	Take in charge tic...	Resolve ticket	Res5	Res3	74.38	long
Case 1002	Task	Gold	Take in charge tic...	Resolve ticket	Res5	Res3	1.12777777777777...	short
Case 1003	Task	Premium	Take in charge tic...	Resolve ticket	Res6	Res3	219.0536111111111	long
Case 1004	Incident	Premium	Take in charge tic...	Resolve ticket	Res5	Res3	25.6158333333333...	long
Case 1005	Task	Premium	Take in charge tic...	Resolve ticket	Res5	Res3	533.6238888888889	long
Case 1006	Question	Gold	Take in charge tic...	Resolve ticket	Res6	Res3	0.00222222222222...	short
Case 1007	Task	Premium	Take in charge tic...	Resolve ticket	Res5	Res4	430.2247222222222	long
Case 1008	Task	Gold	Take in charge tic...	Resolve ticket	Res7	Res3	194.2913888888889	long
Case 101	Question	Premium	Take in charge tic...	Resolve ticket	Res7	Res8	0.95555555555555...	short
Case 1011	Question	Gold	Take in charge tic...	Resolve ticket	Res7	Res8	0.18444444444444...	short
Case 1012	Incident	Premium	Take in charge tic...	Resolve ticket	Res3	Res8	0.01	short
Case 1014	Task	Premium	Take in charge tic...	Resolve ticket	Res4	Res4	0.03722222222222...	short
Case 1015	Incident	Gold	Take in charge tic...	Resolve ticket	Res7	Res8	115.320277777777...	long

Task 4:Throughput times (event-pair-level)

d) Remove the columns 1,4,5, and 8 and export the table. Import it into RapidMiner and discover a decision tree using column 9 (waiting time category) as response variable (label).

Task 4:Throughput times (event-pair-level)

d) Remove the columns 1,4,5, and 8 and export the table. Import it into RapidMiner and discover a decision tree using column 9 (waiting time category) as response variable (label).

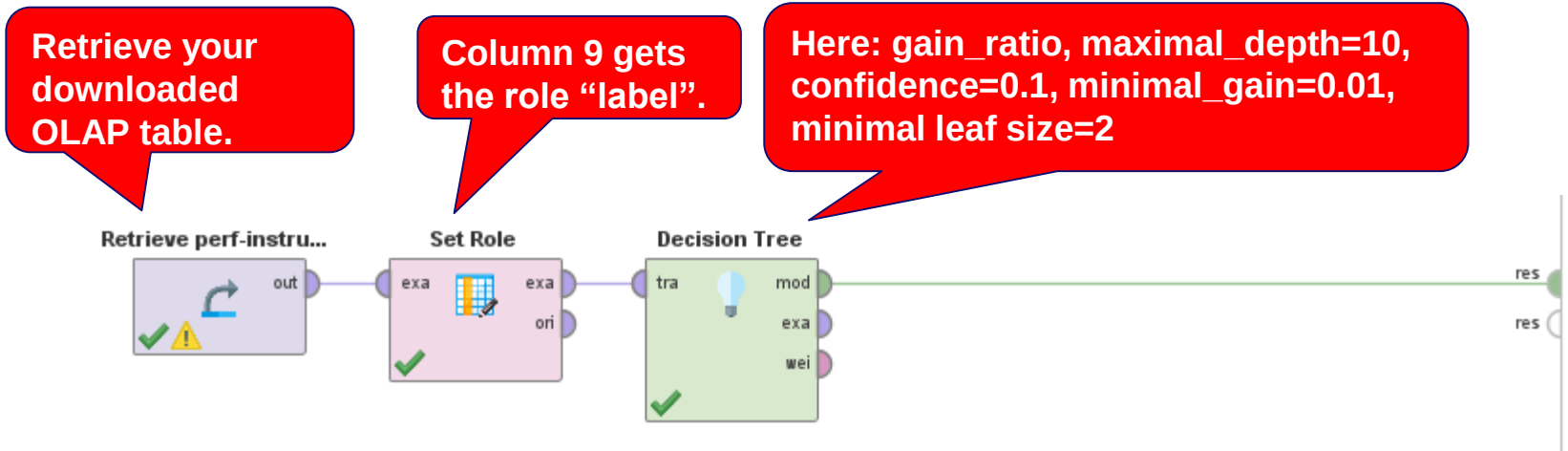
Resulting table after removing columns:

Event-pair-based table

2. TICKET TYPE	3. MEMBERSHIP	6. Source resource	7. Target resource	9. Waiting time category
Question	Gold	Res3	Res4	long
Task	Premium	Res6	Res4	short
Incident	Gold	Res4	Res4	long
Task	Premium	Res5	Res3	long
Task	Gold	Res5	Res3	short
Task	Premium	Res6	Res3	long
Incident	Premium	Res5	Res3	long
Task	Premium	Res5	Res3	long
Question	Gold	Res6	Res3	short
Task	Premium	Res5	Res4	long
Task	Gold	Res7	Res3	long
Question	Premium	Res7	Res8	short
Question	Gold	Res7	Res8	short
Incident	Premium	Res3	Res8	short

Task 4:Throughput times (event-pair-level)

d) Remove the columns 1,4,5, and 8 and export the table. Import it into RapidMiner and discover a decision tree using column 9 (waiting time category) as response variable (label).



Task 4:Throughput times (event-pair-level)

d) Result: