Spark - Exercises

Exercise #58

- Full station identification in real-time
- Input:
  - A stream of readings about the status of the stations of a bike sharing system
    - Each reading has the format
      - stationId,# free slots,#used slots,timestamp

Exercise #58

- Output:
  - For each reading with a number of free slots equal to 0
    - print on the standard output timestamp and stationId
  - Emit new results every 2 seconds by considering only the data received in the last 2 seconds

Exercise #59

- Full situation count in real-time
- Input:
  - A stream of readings about the status of the stations of a bike sharing system
    - Each reading has the format
      - stationId,# free slots,#used slots,timestamp

Exercise #59

- Output:
  - For each batch, print on the standard output the number of readings with a number of free slots equal to 0
  - Emit new results every 2 seconds by considering only the data received in the last 2 seconds

Exercise #6o

- Full distinct stations identification in real-time
- Input:
  - A stream of readings about the status of the stations of a bike sharing system
    - Each reading has the format
      - stationId,# free slots,#used slots,timestamp

Exercise #6o

- Output:
  - For each batch, print on the standard output the **distinct stationIds** associated with a reading with a number of free slots equal to 0 in each batch
  - Emit new results every 2 seconds by considering only the data received in the last 2 seconds

Exercise #61

- Maximum number of free slots in real-time
- Input:
  - A stream of readings about the status of the stations of a bike sharing system
    - Each reading has the format
      - stationId,# free slots,#used slots,timestamp

Exercise #61

- Output:
  - For each batch, print on the standard output the maximum value of the field "# free slots" by considering all the readings of the batch (independently of the stationId)
  - Emit new results every 2 seconds by considering only the data received in the last 2 seconds

Exercise #62

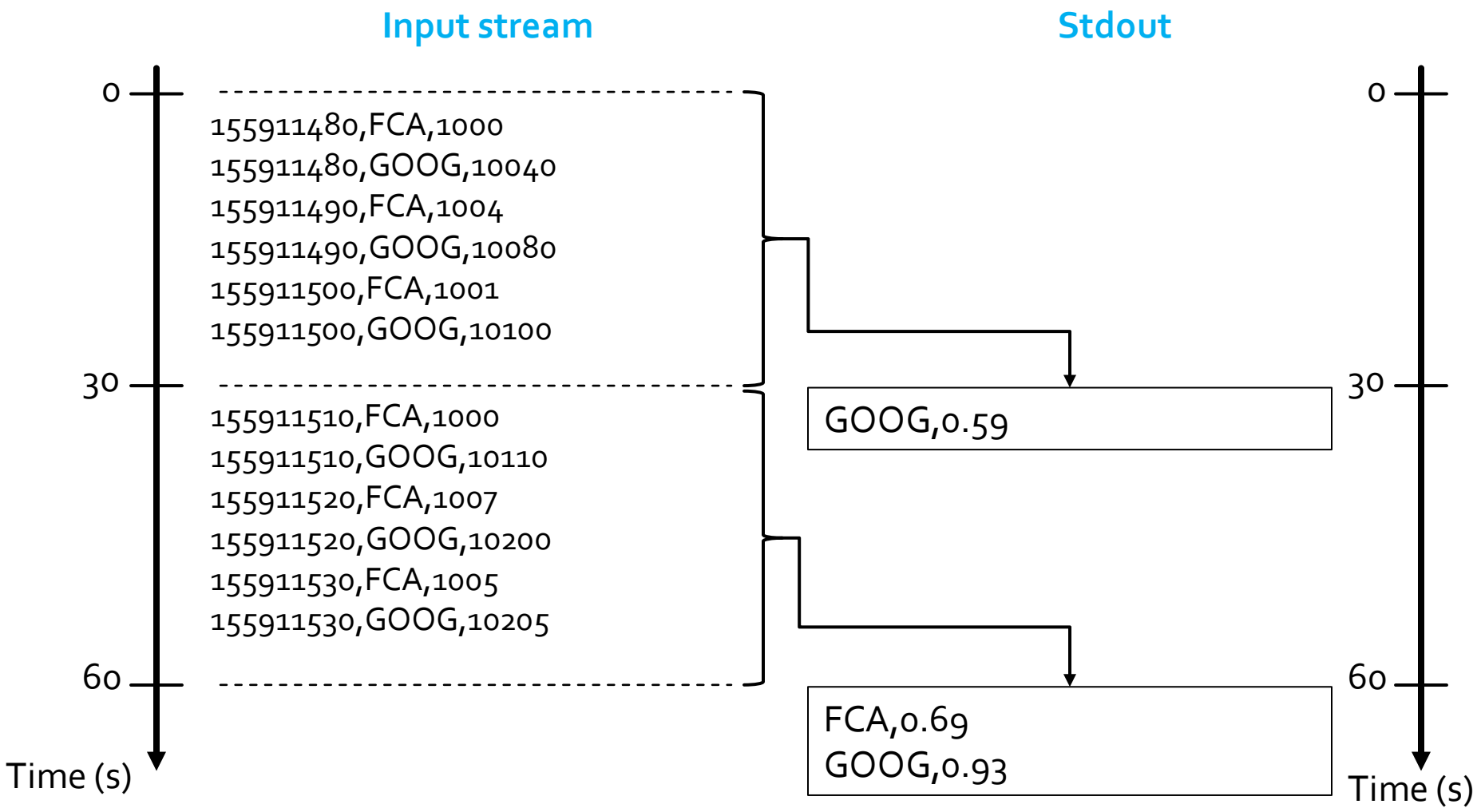
- High stock price variation identification in real-time
- Input:
  - A stream of stock prices
    - Each input record has the format
      - Timestamp,StockID,Price

Exercise #62

- Output:
  - Every 30 seconds print on the standard output the **StockID and the price variation (%) in the last 30 seconds** of the stocks with a **price variation greater than 0.5%** in the last 30 seconds
    - Given a stock, its price variation during the last 30 seconds is:

$$\frac{\max(price)-\min(price)}{\max(price)}$$

Exercise #62- Example



Exercise #62 Bis

- High stock price variation identification in real-time
- Input:
  - A stream of stock prices
    - Each input record has the format
      - Timestamp,StockID,Price

Exercise #62 Bis

- Output:
  - **Every 30 seconds** print on the standard output the **StockID and the price variation (%) in the last 60 seconds** of the stocks with a **price variation greater than 0.5% in the last 60 seconds**
    - Given a stock, its price variation during the last 60 seconds is:

$$\frac{\max(price)-\min(price)}{\max(price)}$$

Exercise #63

- Full station identification in real-time
- Input:
  - A textual file containing the list of stations of a bike sharing system
    - Each line of the file contains the information about one station

      id**\t**longitude**\t**latitude**\t**name
  - A stream of readings about the status of the stations
    - Each reading has the format
      - StationId,# free slots,#used slots,timestamp

Exercise #63

- Output:
  - For each reading with a number of free slots equal to 0
    - print on the standard output timestamp and name of the station
  - Emit new results every 2 seconds by considering only the data received in the last 2 seconds

Exercise #64

- Anomalous stock price identification in real-time
- Input:
  - A textual file containing the historical information about stock prices in the last year
    - Each input record has the format
      - Timestamp,StockID,Price
  - A real time stream of stock prices
    - Each input record has the format
      - Timestamp,StockID,Price

Exercise #64

- Output:
  - Every 1 minute, by considering only the data received in the last 1 minute, print on the standard output the StockIDs of the stocks that satisfy one of the following conditions
    - price of the stock (received on the real-time input data stream) < historical minimum price of that stock (based only on the historical file)
    - price of the stock (received on the real-time input data stream) > historical maximum price of that stock (based only on the historical file)
  - If a stock satisfies the conditions multiple times in the same batch, return the stockId only one time for each batch

Exercise #64- Example

- Textual file containing the historical information about stock prices in the last year

  130000000,FCA,1000

  130000000,GOOG,10040

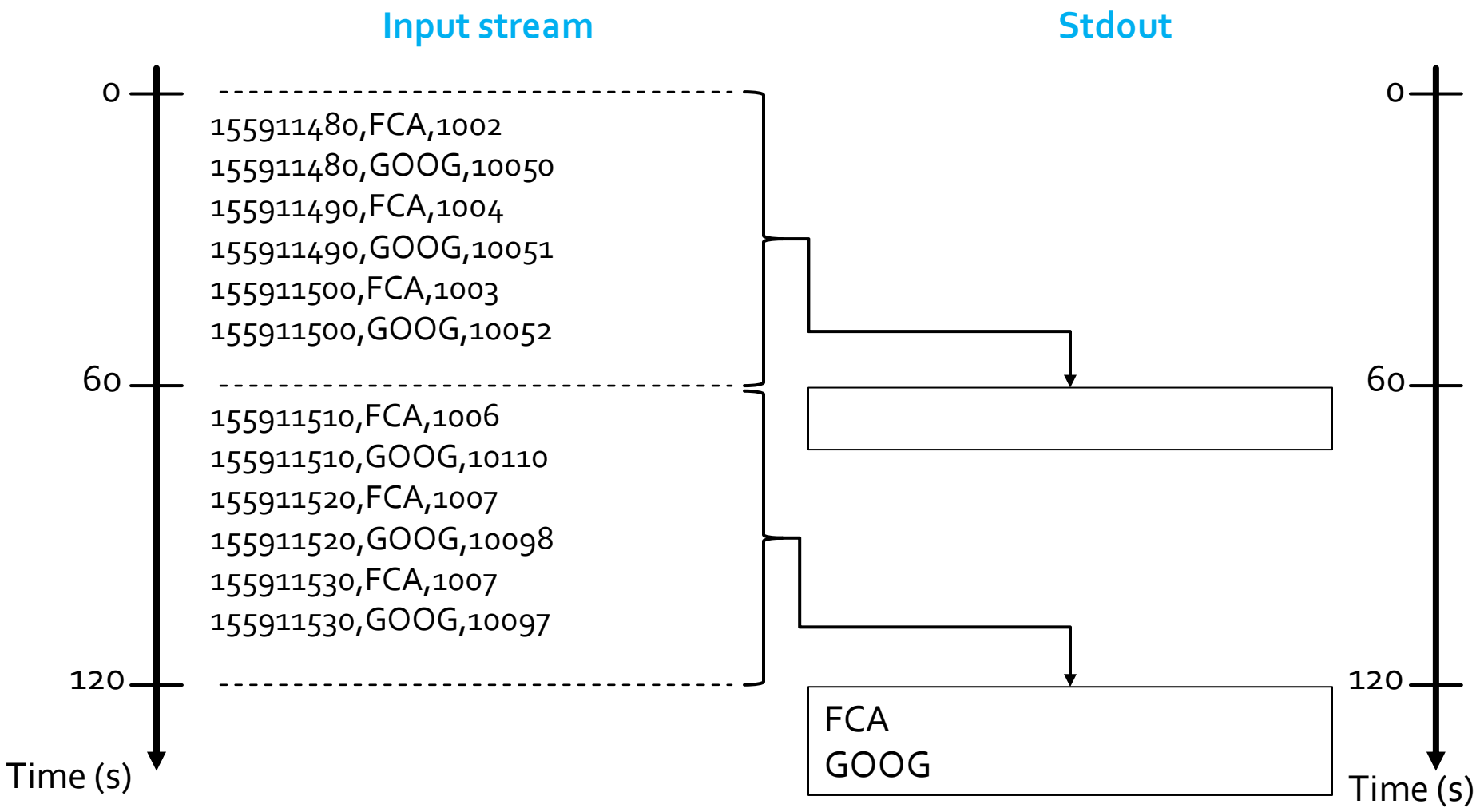
  130000060,FCA,1004

  130000060,GOOG,10080

  130000120,FCA,1001

  130000120,GOOG,10100

Exercise #64- Example



Exercise #65

- Anomalous stock price identification in real-time
- Input:
  - A textual file containing the historical information about stock prices in the last year
    - Each input record has the format
      - Timestamp,StockID,Price
  - A real time stream of stock prices
    - Each input record has the format
      - Timestamp,StockID,Price

Exercise #65

- Output:
  - Every 30 seconds, by considering only the data received in the last 1 minute, print on the standard output the StockIDs of the stocks that satisfy one of the following conditions
    - price of the stock (received on the real-time input data stream) < historical minimum price of that stock (based only on the historical file)
    - price of the stock (received on the real-time input data stream) > historical maximum price of that stock (based only on the historical file)
  - If a stock satisfies the conditions multiple times in the same batch, return the stockId only one time for each batch

Exercise #65- Example

- Textual file containing the historical information about stock prices in the last year

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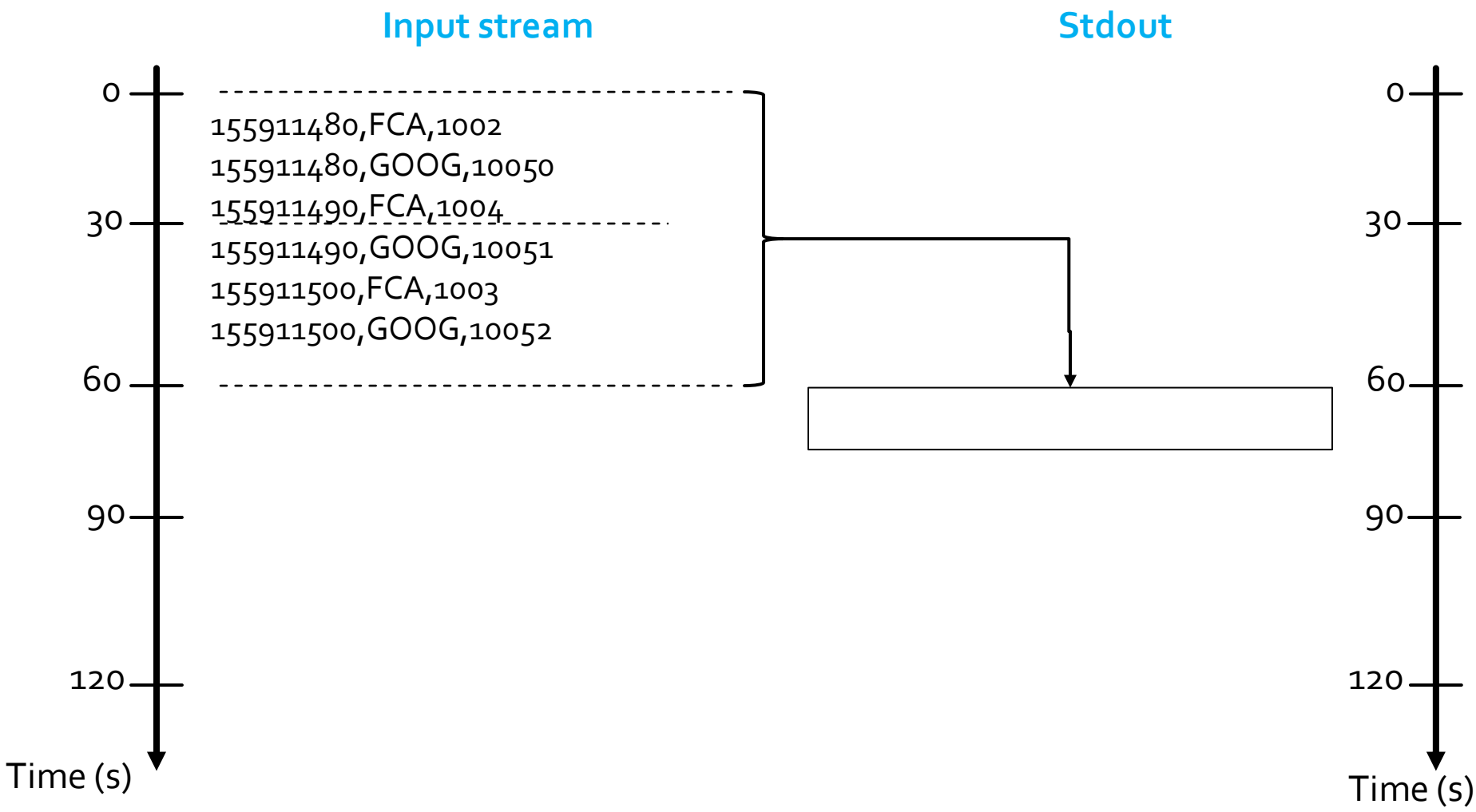
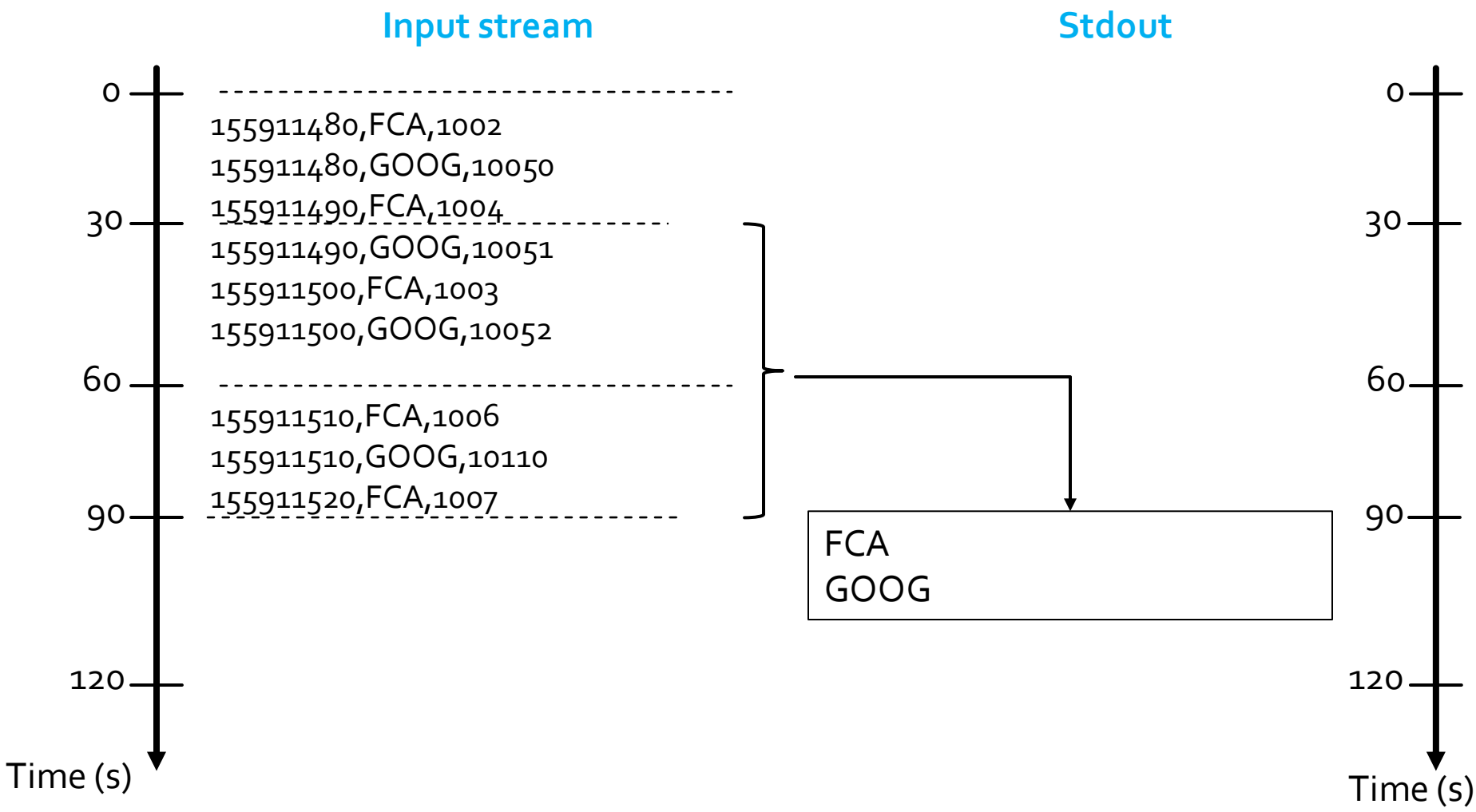
Exercise #65- Example



Exercise #65- Example



Exercise #65- Example