Question Answering and Chatbots

6th Practical exercise – Evaluation in Question Answering over Knowledge Graphs

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Plan for today

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- Demo Session;

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- Review the task for the Exercise 6;

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- Review the task for the Exercise 6;
- Work on the tasks.

Let's start the demo!

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- (User level).

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The metrics are divided into two classes:

- Evaluation of unranked answer sets;
- Evaluation of ranked answer sets.

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	Relevant	Nonrelevant
Retrieved	True Positive (TP)	False Positive (FP)
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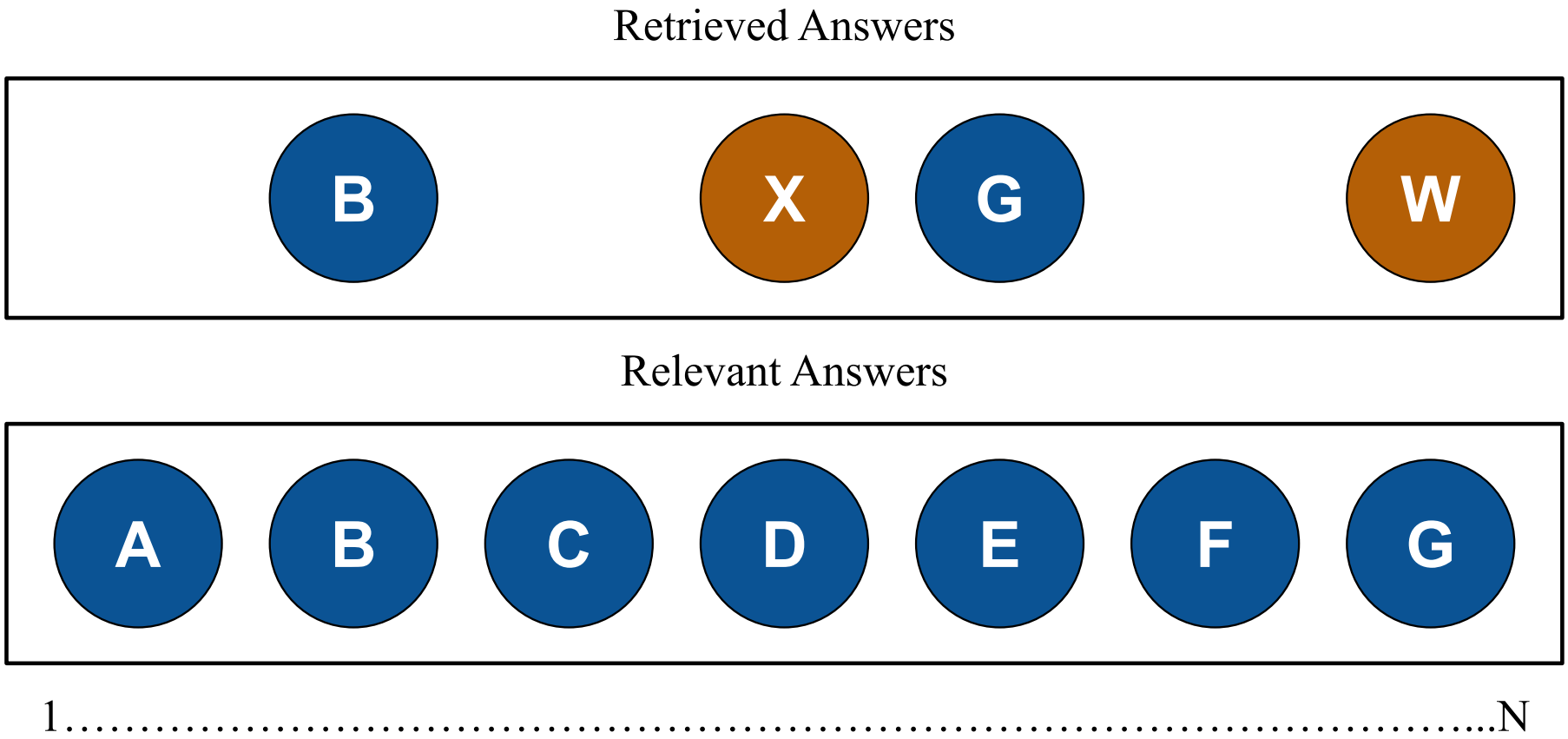
$$Precision = \frac{TP}{TP+FP} = \frac{\#relevant\ retrieved}{\#retrieved} \quad Recall = \frac{TP}{TP+FP} = \frac{\#relevant\ retrieved}{\#relevant}$$

$$F1 = \frac{2*Precision*Recall}{Precision+Recall}$$

Confusion Matrix, Precision, Recall, F1 – unranked



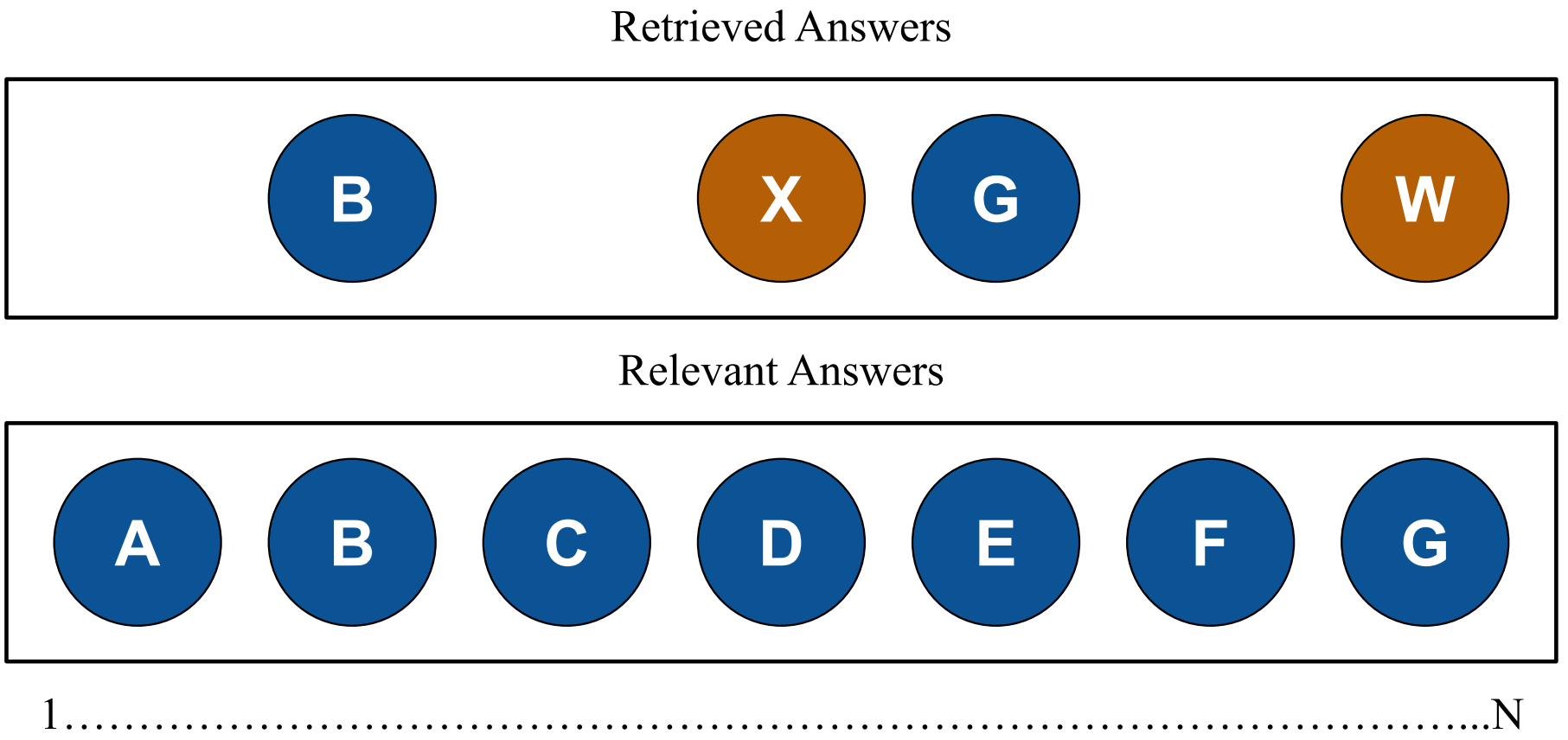
$$Precision = \frac{\#relevant\ retrieved}{\#retrieved} = \frac{2}{4};\ Recall = \frac{\#relevant\ retrieved}{\#relevant} = \frac{2}{7};$$

Precision@k, Recall@k, Reciprocal Rank – ranked

$$Precision@k = \frac{\#relevant\ retrieved\ @k}{\#retrieved\ @k}\ Recall@k = \frac{\#relevant\ retrieved\ @k}{\#relevant};$$

$RR = \frac{1}{rank}$, where *rank* refers to the position of the first relevant answer.

Precision@k, Recall@k, Reciprocal Rank – ranked



$$Precision@5 = \frac{\#relevant\ retrieved\ @5}{\#retrieved\ @5} = \frac{2}{4}\ Recall@5 = \frac{\#relevant\ retrieved\ @5}{\#relevant} = \frac{2}{7};$$

$$RR = \frac{1}{rank} = \frac{1}{1}$$

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  - How diverse is the actual audience?
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  - What is the satisfaction level?

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- Metrics:
  - Time per question (TpQ);
  - Rate of return (RoR);
  - Difference between e.g., RoR_{20yrs} *vs* RoR_{60yrs}
  - Survey analysis;
  - Feedback analysis.

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  - For each component: Execution time, Confusion Matrix, Precision, Recall, and F1 Score;
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- Optional: Create visualizations based on your .csv report;

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- Optional: Create visualizations based on your .csv report;
- Optional: Propose a set of metrics to quantify user utility of your system s.t. it is possible to evaluate the user "happiness".

Let's do the work!

0 Introduction;
1 NER & NEL;
2 Question classification & Web service/API;
3 SPARQL queries over Knowledge Graphs;
4 Simple KGQA system – based on exercises 0, 1, 2, 3;
5 Qanary Framework – component oriented approach;
6 **Evaluation of QA systems**;
7 Simple ODQA system.