1. Extract is-a relations from the following sentence, and derive all is-a relations using the transitivity of the is-a relation.

*We have rules for keeping animals, such as horses and other farm animals, especially cows and chickens.*

Answer:

horse isa animal, cow isa animal, chicken isa animal, farm animal isa animal, horse isa farm animal, cow isa farm animal, chicken isa farm animal

1. Compute the TF-IDF values of “knowledge”, “AI” and “Engineering” with the statistics in the following tables, and rank them (Computing IDF using lg).

|  |  |
| --- | --- |
| Doc1 | |
| Term | Count |
| Knowledge | 3 |
| AI | 6 |
| Engineering | 4 |

|  |  |
| --- | --- |
| Doc2 | |
| Term | Count |
| Knowledge | 0 |
| AI | 5 |
| Engineering | 1 |

|  |  |
| --- | --- |
| Doc3 | |
| Term | Count |
| Knowledge | 0 |
| AI | 0 |
| Engineering | 5 |

Answer:

Doc1:

TF-IDF (Knowledge)= 3/13\*lg(3/2)=0.0406 **rank 1**

TF-IDF (AI) = 6/13\*lg(3/3) = 0 **rank 2**

TF-IDF (Engineering) = 4/13\*lg(3/4)= -0.0384 **rank3**

Doc2:

TF-IDF (Knowledge)= 0 **rank 1**

TF-IDF (AI) = 5/6\*lg(3/3) = 0 **rank 1**

TF-IDF (Engineering) = 1/6\*lg(3/4)= -0.0208 **rank3**

Doc3:

TF-IDF (Knowledge)= 0 **rank 1**

TF-IDF (AI) = 0 **rank 1**

TF-IDF (Engineering) = 1\*lg(3/4)= -0.1249 **rank3**