### The pseudo code in (PF)Specification-stage

1. The pseudo code of feature **Sim(Q,KBQ)**：

Input：Query and Question

Output：**Sim(Q,KBQ)**

1. list1 = semantic(Query),list2 = semantic(Question)

**1.1 Extract the semantic block of Query to form list1, extract the semantic block of Question to form list2**

1. for i, item1 in enumerate(list1)

**1.2 Iterate through list1 to get each semantic block item item1 of the Query**

1. for i, item2 in enumerate(list2)

**1.3 Iterate through list2 to get each semantic block item item2 of the Question**

1. score = synonyms.compare(item1, item2, seg=False)

**1.4 Use the Synonyms toolkit to calculate the similarity between item1 and item2 semantic blocks to get the score, seg=False means no more splitting of semantic blocks**

1. if score > score\_max: score\_max = score

**1.5 score\_max is used to semantically preserve the maximum value of the similarity score**

1. list.append(score\_max)

**1.6 To get the score\_max of item1 on item2 and save it in the list**

1. **Repeat b), c), d) ,e) and f) until you get the score\_max of each item of list1 in list2 and save it to list**
2. Sim(Q,KBQ) = sum(list) / len(list)

（2）The pseudo code of feature **Sim(Q,KBA)**：

Input：Query and Answer

Output：**Sim(Q,KBA)**

1. list1 = semantic(Query),list2 = semantic(Answer)

**1.1 Extract the semantic block of Query to form list1, extract the semantic block of Answer to form list2**

1. for i, item1 in enumerate(list1)

**1.2 Iterate through list1 to get each semantic block item item1 of the Query**

1. for i, item2 in enumerate(list2)

**1.3 Iterate through list2 to get each semantic block item item2 of the Answer**

1. score = synonyms.compare(item1, item2, seg=False)

**1.4 Use the Synonyms toolkit to calculate the similarity between item1 and item2 semantic blocks to get the score, seg=False means no more splitting of semantic blocks**

1. if score > score\_max: score\_max = score

**1.5 score\_max is used to semantically preserve the maximum value of the similarity score**

1. list.append(score\_max)

**1.6 To get the score\_max of item1 on item2 and save it in the list**

1. Repeat b), c), d) ,e) and f) until you get the score\_max of each item of list1 in list2 and save it to list
2. **Sim(Q,KBA) =** sum(list) / len(list)

（2）The pseudo code of feature **Sim(QE,KBQE)**

Input：Query and Question

Output：**Sim(QE,KBQE)**

1. list1 = Entity(Query),list2 = Entity(Question)

**1.1 Extract the entity of Query to form list1, extract the entity of Question to form list2**

1. for word in list1+list2:  
    if word not in cilin\_vocab:  
    vocab\_no\_words.append(word)

**1.2 For each word in list1 and list2, look up the word in cilin\_vocab and save the words not included in cilin\_vocab to vocab\_no\_words**

1. for i, item1 in enumerate(list1)

**1.3 Iterate through list1 to get each entity item item1 of the Query**

1. for i, item2 in enumerate(list2)

**1.4 Iterate through list2 to get each entity item item2 of the Question**

1. inter = (set([item1, item2]).intersection(set(vocab\_no\_words)))

**1.5 Determine if item1 and item2 exist in vocab\_no\_words**

1. if inter:

score = synonyms.compare(item1, item2, seg=False)

**1.6 If it exists,use the Synonyms toolkit to calculate the similarity between item1 and item2 semantic blocks to get the score, seg=False means no more splitting of semantic blocks**

1. else:

score = ci\_lin.sim2018(item1, item2)

**1.7 If not, calculate the similarity score of item1 and item2 using the HIT synonym word forest method**

h) if score > score\_max: score\_max = score

**1.8 score\_max is used to store the maximum value of entity similarity.**

1. list.append(score\_max)

**1.9 To get the score\_max of item1 on item2 and save it in the list**

1. **Repeat c), d), e), f), g), h) and i) until you get the score\_max of list1 in list2 and save it to list**
2. Sim(QE,KBQE) = sum(list)/len(list)
3. The pseudo code of feature **Sim(QR,KBQR)**

输入：Query and Question

输出：**Sim(QR,KBQR)**

1. list1 = Entity(Query),list2 = Entity(Question)

**1.1 Extract the Relation of Query to form list1, extract the Relation of Question to form list2**

1. for i, item1 in enumerate(list1):

**1.2 Iterate through list1 to get each Relation item item1 of the Query**

1. for i, item2 in enumerate(list2):

**1.3 Iterate through list2 to get each Relation item item2 of the Question**

1. score = synonyms.compare(item1, item2, seg=False)

**1.4 use the Synonyms toolkit to calculate the similarity between item1 and item2 semantic blocks to get the score, seg=False means no more splitting of semantic blocks**

1. if score > score\_max: score\_max = score

**1.5 score\_max is used to store the maximum value of Relation similarity.**

1. **Repeat b), c), d), e) until you get the score\_max for each item of list1 in list2**
2. Sim(QR,KBQR) = score\_max