

Input Parameters

- Original ranking, existingResults
- Diversification depth ($k=30$)
- w , weighting for diversification scoring component

Output

- Manipulated array of results, diversified to depth k (see above)

Helper Functions

- `getEntities(x,y,z)` Returns an array results x , returns an array of entities present in documents in array range y to z
- `getLength(x)` Returns the length of array x
- `getUnseenEntities(x,y)` Returns entities in document x that have not yet been observed in ranked document array y
- `sortByScore(x)` Sorts document array x by score in descending order
- `<array>.pop()` Removes the top entry from an array, returning the popped value

```
SET entities TO []
SET newRankings TO []
SET i TO 1
```

```
# Take the top result from the baseline results, popping results
SET newRankings[0] TO existingResults.pop()
```

```
WHILE i <= k DO
  # Obtain all entities from the first to ith result
  SET entities TO getEntities(existingResults, 0, i-1)
  SET j TO 0

  # Now rescore all remaining results, considering weighting w
  WHILE j <= getLength(existingResults) DO
    SET newEntityCount TO
      getUnseenEntities(document, existingResults)
    SET existingResults[j].score TO score + (w·newEntityCount)
    SET j TO j + 1
  END WHILE

  # Now reorder the rescored existingResults array
  # As existingResults is now reordered, move top result to new array
  sortByScore(existingResults)
  SET newRankings[i] TO existingResults.pop()
  SET i TO i + 1
END WHILE
```