Advanced Use of The Rank Operator

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Previously…

Dyalog Webinars: The Rank Operator

dyalog.tv/Webinar?v=IBct81IopRk

Advanced Use of The Rank Operator

Negative Rank ⍤¯1

Multiple Rank ⍤1⍤1

Rank f⍤k

```
      ⍞←a←2 3 4⍴⎕A
ABCD
EFGH
IJKL

MNOP
QRST
UVWX
```

```
      (⊂⍤1)2 3 4⍴⎕A
```

ABCD	EFGH	IJKL
MNOP	QRST	UVWX

```
      (⌽⍤1)2 3 4⍴⎕A
DCBA
HGFE
LKJI

PONM
TSRQ
XWVU
```

Rank f⍤k

```
      ⍞←a←2 3 4⍴⍳⎕A
ABCD
EFGH
IJKL

MNOP
QRST
UVWX
```

```
      (⊂⍤2)2 3 4⍴⍳⎕A
```

ABCD EFGH IJKL	MNOP QRST UVWX

```
      (⌽⍤2)2 3 4⍴⍳⎕A
IJKL
EFGH
ABCD

UVWX
QRST
MNOP
```

Rank f⍤k

```
      ⍞←a←2 3 4⍴⎕A
ABCD
EFGH
IJKL

MNOP
QRST
UVWX
```

```
      (⊂⍤3)2 3 4⍴⎕A
┌────┐
│ABCD│
│EFGH│
│IJKL│
│    │
│MNOP│
│QRST│
│UVWX│
└────┘
```

```
      (⍟⍤3)2 3 4⍴⎕A
MNOP
QRST
UVWX

ABCD
EFGH
IJKL
```

Relative Rank

f⍤"∞"

```
      □←a←2 3 4⍴□A
ABCD
EFGH
IJKL

MNOP
QRST
UVWX
```

```
      (⊂⍤99)2 3 4⍴□A
┌────┐
│ABCD│
│EFGH│
│IJKL│
│    │
│MNOP│
│QRST│
│UVWX│
└────┘
```

```
      (⍺⍤99)2 3 4⍴□A
MNOP
QRST
UVWX

ABCD
EFGH
IJKL
```

Relative Rank

f⍤"∞"

```
      □←a←2 3 4⍴□A
ABCD
EFGH
IJKL

MNOP
QRST
UVWX
```

```
      (⊂⍤(⌊/⍳))2 3 4⍴□A
┌────┐
│ABCD│
│EFGH│
│IJKL│
│    │
│MNOP│
│QRST│
│UVWX│
└────┘
```

```
      (⍳⍤(⌊/⍳))2 3 4⍴□A
MNOP
QRST
UVWX

ABCD
EFGH
IJKL
```

Relative Rank f⍤¯k

```
      ⍞←a←2 3 4⍴⍞A
ABCD
EFGH
IJKL

MNOP
QRST
UVWX
```

```
      (⊂⍤¯1)2 3 4⍴⍞A
```

ABCD	MNOP
EFGH	QRST
IJKL	UVWX

```
      (⊖⍤¯1)2 3 4⍴⍞A
IJKL
EFGH
ABCD

UVWX
QRST
MNOP
```

Relative Rank f⍤¯k

```
      ⎕←a←2 3 4⍴⎕A
ABCD
EFGH
IJKL

MNOP
QRST
UVWX
```

```
      (⊂⍤¯2)2 3 4⍴⎕A
┌────┬────┬────┐
│ABCD│EFGH│IJKL│
├────┼────┼────┤
│MNOP│QRST│UVWX│
└────┴────┴────┘
```

```
      (⊖⍤¯2)2 3 4⍴⎕A
DCBA
HGFE
LKJI

PONM
TSRQ
XWVU
```

Relative Rank f⍤¯ k

```
      □←a←2 3 4⍴□A
ABCD
EFGH
IJKL

MNOP
QRST
UVWX
```

```
      (⊂⍤¯3)2 3 4⍴□A
ABCD
EFGH
IJKL

MNOP
QRST
UVWX
```

```
      (⍷⍤¯3)2 3 4⍴□A
ABCD
EFGH
IJKL

MNOP
QRST
UVWX
```

Benefits of Rank

- `⎕IO` independent

User defined functions

Laminate

```
(,[0.5])
```

```
      'ABCD' (,[0.5]) 1 2 3 4
A B C D
1 2 3 4
      'ABCD' (⍉,⍤0) 1 2 3 4
A B C D
1 2 3 4
```

Laminate

```
(,[0.5])
```

```
      'ABCD' (,⍤0) 1 2 3 4
A 1
B 2
C 3
D 4
```

Laminate+

```
(,[⌶])
```

```
      'ABCD' {} 2 4⍴⍳8
A 1
B 2
C 3
D 4

A 5
B 6
C 7
D 8
```

Laminate+

```
(,[⌷])
```

```
      'ABCD' (,⍤0⍤1) 2 4⍴⍳8
A 1
B 2
C 3
D 4

A 5
B 6
C 7
D 8
```

Laminate+

(,[□])

```
      'ABCD' (,⍤0⍤1) 1 2 3 4
                     5 6 7 8
```

Laminate+

```
('ABCD' (,⍤0⍤1) 1 2 3 4
                5 6 7 8)
```

Laminate+

```
(,[0.5])
```

```
'ABCD' (,⍤0⍤1) 1 2 3 4
               5 6 7 8
```

Laminate+

```
(,[0.5])
```

```
      'ABCD' (,⍤0⍤1) 1 2 3 4
A 1                  5 6 7 8
```

Laminate+

```
(,[0.5])
```

```
      'ABCD' (,⍤0⍤1) 1 2 3 4
A 1                  5 6 7 8
B 2
```

Laminate+

```
(,[0.5])
```

```
      'ABCD' (,⍤0⍤1) 1 2 3 4
A 1                  5 6 7 8
B 2
C 3
```

Laminate+

```
(,[0.5])
```

```
      'ABCD' (,⍤0⍤1) 1 2 3 4
A 1                  5 6 7 8
B 2
C 3
D 4
```

Laminate+

```
      'ABCD' (,⍤0⍤1) 1 2 3 4
                     5 6 7 8
A 1
B 2
C 3
D 4

A 5
```

```
(,[0.5])
```

Laminate+

```
('ABCD' (,⍤0⍤1) 1 2 3 4)
(,[0.5])
```

```
'ABCD' (,⍤0⍤1) 1 2 3 4
A 1          5 6 7 8
B 2
C 3
D 4

A 5
B 6
```

Laminate+

```
      'ABCD' (,⍤0⍤1) 1 2 3 4
                     5 6 7 8
A 1
B 2
C 3
D 4

A 5
B 6
C 7
```

```
(,[0.5])
```

Laminate+

```
(,[0.5])
```

```
      'ABCD' (,⍤0⍤1) 1 2 3 4
A 1                  5 6 7 8
B 2
C 3
D 4

A 5
B 6
C 7
D 8
```

Laminate+

(,[0.5])

```
      'ABCD'{(αρ⍤¨ρω),[2.5]ω}2 4ρ⍳8
A 1
B 2
C 3
D 4

A 5
B 6
C 7
D 8
```

Laminate+

```
(,[0.5])
```

```
      'ABCD' (,⍤0⍤1) 2 4⍴⍳8
A 1
B 2
C 3
D 4

A 5
B 6
C 7
D 8
```

Laminate+

```
(,[0.5])
```

```
      (2 4⍴⍳8) (,⍤0⍤1) 'ABCD'
1 A
2 B
3 C
4 D

5 A
6 B
7 C
8 D
```

_Table

```
      _Table←{⍺ ⍺⍺⍤1⍤1 99⊢⍵}
      pos←?1000 3⍴0

]runtime -c "↑∘.+⍨↓pos" "+_Table⍨pos"

  ↑∘.+⍨↓pos    → 8.8E¯2 |    0% ⎕⎕⎕⎕⎕⎕⎕⎕⎕⎕⎕⎕⎕⎕⎕⎕⎕⎕⎕⎕⎕⎕⎕⎕⎕⎕⎕⎕⎕⎕⎕⎕⎕⎕⎕⎕⎕⎕⎕⎕
  +_Table⍨pos → 5.5E¯3 | -94% ⎕⎕
```

Advanced Use of The Rank Operator

Negative Rank ⍤¯1

Multiple Rank ⍤1⍤1

Future Webinar…

The Rank Operator and Transpose

⍤k⊢⍴⍉

Next Webinar

Language Features of

Dyalog version 18.0 in Depth (Part 5)

September 3rd **15:00 UTC** Adám Brudzewsky

Next Week

British APL Association Open Session

britishaplassociation.org/webinar-schedule-2020

August 27th 15:00 UTC