
Subject: Re: Variable stride in array indices
Posted by [Liam Gumley](#) on Fri, 07 May 1999 07:00:00 GMT
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Kenneth P. Bowman wrote:

> We haven't had a good argument about IDL syntax lately, so I thought I
> would ask why IDL does not allow variable stride in array indices. For
> example, if
>
> zz = z[0:5:2]
>
> then zz would contain [z[0], z[2], z[4]].
>
> I realize that this kind of thing can be done with array subscript lists
> such as z[[0, 2, 4]], but this can be awkward for multidimensional
> arrays. It is also necessary to *store* the lists of subscripts, and I
> believe that implementation through indirect subscripts must be slower
> than implementing strides through direct iteration (i.e., internal
> compiled DO loops).

In fact we had a good argument recently here at SSEC about indexing 2D arrays with variable stride. The argument was this: If I have an array a, and an index array x, why doesn't a[x,x] extract a 2D subsampled array? (it returns a 1D array).

Here's what we resolved:

Say I want to extract every 2nd row and column of an array:

```
IDL> a=indgen(10,10)
```

First, I create the index array:

```
IDL> x=indgen(5)*2
```

```
IDL> print,x
```

```
0  2  4  6  8
```

I can select the columns:

```
IDL> print,a[x,*]
```

```
0  2  4  6  8
10 12 14 16 18
20 22 24 26 28
30 32 34 36 38
40 42 44 46 48
50 52 54 56 58
60 62 64 66 68
70 72 74 76 78
```

```
80  82  84  86  88
90  92  94  96  98
```

Or I can select the columns and rows at the same time:

```
IDL> print,(a[x,*])[*,x]
  0   2   4   6   8
20  22  24  26  28
40  42  44  46  48
60  62  64  66  68
80  82  84  86  88
```

This is equivalent to the following

```
IDL> a=a[x,*]
IDL> print,a
  0   2   4   6   8
10  12  14  16  18
20  22  24  26  28
30  32  34  36  38
40  42  44  46  48
50  52  54  56  58
60  62  64  66  68
70  72  74  76  78
80  82  84  86  88
90  92  94  96  98
```

```
IDL> a=a[:,x]
IDL> print,a
  0   2   4   6   8
20  22  24  26  28
40  42  44  46  48
60  62  64  66  68
80  82  84  86  88
```

Cheers,
Liam.

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