Subject: Re: bits from bytes
Posted by davidf on Fri, 19 Dec 1997 08:00:00 GMT
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Kelly Dean (krdean@lamar.colostate.edu) writes:

> I need to extract the first 3 bits from a byte.
> Any suggestions?

If I am sure of anything, I am sure this is NOT the way
to do this. :-)

But you reminded me I had this program lying around here
waiting for a reason to use it. One night not too long ago
I couldn't sleep and for some reason (this is really *weird*)
I began to wonder what the binary representation of a certain
number was. Don't ask me why, I couldn't tell you. It seemed
important in that strange twilight time between when you begin
to lose consciousness and really fall asleep. Do you know what
I mean?

Anyway, I wanted to know. So I wrote this IDL program the
next morning. I guess you could figure out how to use
it to extract the first three bits from a byte, if you
wanted to. Or, you could wait for Kevin Ivory to send you
the *real* answer. :-)

If I have the byte value 5, I would use it like this:

```
  Print, Binary(5B)
```

It prints out: 0 0 0 0 0 1 0 1.

Happy Holidays!

David

```
**********************************************************
FUNCTION BINARY, number

  ; This function returns the binary representation
  ; of a number. Numbers are converted to LONG integers
  ; if necessary.

On_Error, 1
s = SIZE(number)
type = s[s[0] + 1]
IF type EQ 0 THEN Message, 'Number parameter must be defined.'
```

```
IF type EQ 1 OR type EQ 2 THEN BEGIN
   bin = STRARR(8*type)
   FOR j=0,(type*8)-1 DO BEGIN
      powerOfTwo = 2L^j
      IF (LONG(number) AND powerOfTwo) EQ powerOfTwo THEN $
         bin(j) = '1' ELSE bin(j) = '0'
   ENDFOR
ENDIF ELSE BEGIN
   Print, 'Converting "number" to LONG...'
   number = LONG(number)
   bin = STRARR(32)
   FOR j=0,31 DO BEGIN
      powerOfTwo = 2L^j
      IF (LONG(number) AND powerOfTwo) EQ powerOfTwo THEN $
         bin(j) = '1' ELSE bin(j) = '0'
   ENDFOR
ENDELSE

RETURN, REVERSE(bin)
END
```

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Subject: Re: bits from bytes
Posted by Kevin Ivory on Sat, 20 Dec 1997 08:00:00 GMT
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David Fanning wrote:
> Anyway, I wanted to know. So I wrote this IDL program the
> next morning. I guess you could figure out how to use
> it to extract the first three bits from a byte, if you
> wanted to. Or, you could wait for Kevin Ivory to send you
> the *real* answer. :-)

I am a little late today. My answer is the same as the one by
Robert Moss: to extract the first three bits from a byte:

```
   print, i_byte and 7
```

David, I like the idea of the function 'BINARY' to return a human
readable representation of numbers. But even a good IDL program
can become a "bit" better by eliminating the loops.
The part I included as a comment about floating point values is
what most people looking at binary representations will actually

want to have.

```
FUNCTION BINARY, number
;+
; PURPOSE:
;   This function returns the binary representation
;   of a number. Numbers are converted to LONG integers
;   if necessary.
; EXAMPLE:
;   Binary representation of 11B:
;     IDL> print, binary(11B)
;     0 0 0 0 1 0 1 1
;   If data extraction is used instead of conversion ->
;   Binary representation of pi (little endian IEEE representation):
;     IDL> print, format='(z9.8,5x,4(1x,8a1))', long(!pi,0), binary(!pi)
;     40490fdb      01000000 01001001 00001111 11011011
;-
  On_Error, 1
  s = SIZE(number)
  type = s[s[0] + 1]
  IF type EQ 0 THEN Message, 'Number parameter must be defined.'
  bit = ['0','1']
  IF type EQ 1 OR type EQ 2 THEN BEGIN
    bitvalue = 2^INDGEN(8*type)
  ENDIF ELSE BEGIN
    Print, 'Converting "number" to LONG...'
    number = LONG(number)       ; data conversion
;   If you want the binary representation of the floating point value,
;   use extraction instead of conversion:
;   number = LONG(number, 0)    ; data extraction
    bitvalue = 2L^LINDGEN(32)
  ENDELSE

  RETURN, REVERSE(bit((number AND bitvalue) EQ bitvalue))
END
```

Have nice and relaxing holidays,
Kevin
--

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Subject: Re: bits from bytes
Posted by Robert Moss on Sat, 20 Dec 1997 08:00:00 GMT

Kelly Dean wrote:
>
> I need to extract the first 3 bits from a byte.
>
> Any suggestions?
>
> Kelly Dean
> CSU/CIRA

```
b = 11B   ; a byte of data
foo = [ 2^0, 2^1, 2^2, 2^3 ]
bits = ( b AND foo ) ne 0
print, bits[0]
 1
print, bits[1]
 1
print, bits[2]
 0
print, bits[3]
 1
```

I assume of course you have encoded information into each
individual bit. If what you want is the first three bits together,
it would simply be (b AND 7) = 3

--
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