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Subject: Re: Searching in a sorted array

Posted by [Martin Schultz](#) on Mon, 26 Apr 1999 07:00:00 GMT

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Tri VU KHAC wrote:

>  
> Hi folks,  
>  
> subject : Searching an element replying to a criteria in an unique &  
> sorted array  
>  
> I think every programmer can make an efficient Finder function replying  
> to this request.  
> For example: Looking for the last element smaller than or equal 100 in a  
> sorted array.  
>  
> If you do this program in C/C++, you must use the recursive function or  
> repeat, for, while.  
> My question is, does IDL have a built-in function for doing this.  
> Why this ? Well, because of computing time.  
>  
> Thank you for your suggestion.  
>  
> Best regards,  
>  
> Tri.

Please find attached a little binary search routine that I hacked a few months ago for another request on this group. Hope, it helps,  
Martin.

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-----  
; \$Id: search.pro,v 1.10 1999/01/22 20:12:17 mgs Stab \$  
;-----

;+  
; NAME:  
; SEARCH (function)

```

;
; PURPOSE:
;   Perform a binary search for the data point closest
;   to a given value. Data must be sorted.
;
; CATEGORY:
;   Math
;
; CALLING SEQUENCE:
;   index = SEARCH( DATA, VALUE )
;
; INPUTS:
;   DATA -> a sorted data vector
;
;   VALUE -> the value to look for
;
; KEYWORD PARAMETERS:
;   none.
;
; OUTPUTS:
;   The function returns the index of the nearest data
;   point.
;
; SUBROUTINES:
;
; REQUIREMENTS:
;
; NOTES:
;   This routine is much faster than WHERE or MIN for
;   large arrays. It was written in response to a newsgroup
;   request by K.P. Bowman.
;
; EXAMPLE:
;   test = findgen(10000)
;   print,search(test,532.3)
;   ; prints 532
;
; MODIFICATION HISTORY:
;   mgs, 21 Sep 1998: VERSION 1.00
;
;-
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; Bugs and comments should be directed to mgs@io.harvard.edu
; with subject "IDL routine search"
;-----
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```
function search,data,value

; search first occurrence of value in data set
; data must be sorted

; simple error checking on data and value
if (n_elements(value) eq 0) then begin
    message,'Must supply sorted data array and value),/CONT
    return
endif

ndat = n_elements(data)

try = fix(0.5*ndat)
step = 0.5*try

; find index of nearest points
while (step gt 1) do begin
    if (data[try] gt value) then $
        try = try-step $
    else $
        try = try+step
    step = fix(0.5*(step+1))
endwhile

; now get the data point closest to value
; can only be one out of three (try-1, try, try+1)
dummy = min( abs(value-data[try-1:try+1]), location )

return,try+location-1

end
```

## File Attachments

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1) [search.pro](#), downloaded 94 times

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