

## POINTER SORTING

### Problem

Suppose you were given the following list of baseball players, their teams and the number of home runs they hit during their careers and asked to sort them by home runs in descending/ascending order. (See solution in pointersorting.vbp)

Ruth	New York	714
Robinson	Baltimore	586
Mantle	New York	536
Mays	San Francisco	660
Killebrew	Detroit	573
Aaron	Atlanta	755

Knowing what we know now, we would store each field in a separate array first. Then we would use a sort based on home runs. When two home run totals were in the wrong order we would swap them, but this wouldn't be enough. We would also need to swap the corresponding names and cities. (See the code behind the Exchange Sort button). As you can see, with multi field records, when we are sorting there may be a tremendous amount of extra work involved.

### Sorting Using Pointers

The principle behind this type of ordering is that *elements in a list are never moved* and are not actually sorted. What gets rearranged into an ascending sequence are the subscripts of the array. The neat thing about this trick is that, as we are sorting records with several fields, we never need to move masses of data around. The corresponding fields are carried with the field that is being sorted. Subsequent to sorting, the access to the elements of the array is through the ordered list of subscripts.

### Explanation (ascending order)

Name(1)	Name(2)	Name(3)
Ruth	Robinson	Mantle
City(1)	City(2)	City(3)
New York	Baltimore	New York
HomeRuns(1)	HomeRuns(2)	HomeRuns(3)
714	586	536
<b>P(1)=1</b>	<b>P(2)=2</b>	<b>P(3)=3</b>

After the first sweep through the sort, only the pointer locations are exchanged.

P(1)=3	P(2)=1	P(3)=2
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After the second sweep through

P(1)=3	P(2)=2	P(3)=1
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After the sort the Name(), City() and HomeRuns() are unchanged, only the P() values have been exchanged.

Name(P(1))=Name(3)="Mantle"

City(P(1))=City(3)="New York"

HomeRuns(P(1))=HomeRuns(3)=536

Name(P(2))=Name(2)="Robinson"

City(P(2))=City(2)="Baltimore"

HomeRuns(P(2))=HomeRuns(2)=586

Name(P(3))=Name(1)="Ruth"

City(P(3))=City(1)="New York"

HomeRuns(P(3))=HomeRuns(1)=714

### Exercise Problem

Below is a list of students, their ages, and their heights in cm.

Name	Age	Height
Tom	16	171
Mary	18	162
Karen	14	168
Zenon	17	180
Bob	14	174
Laura	15	169

Write a program which sorts the list by age.