

RECOMP II USERS' PROGRAM NO. 1076

PROGRAM TITLE: MAXIMUM, MINIMUM, MEDIAN (SORTER) SUBROUTINE

PROGRAM CLASSIFICATION: Subroutine

AUTHOR: G. V. Roberts
 Information Processing Unit
 Systems Evaluation Group
 Autonetics

PURPOSE: A subroutine has been written to determine
 the maximum, minimum, and median of a set of
 numbers, and also to arrange them in order of
 magnitude, from the maximum to the minimum.

DATE: 15 June 1961

Published by
RECOMP Users' Library
at
AUTONETICS INDUSTRIAL PRODUCTS
A DIVISION OF NORTH AMERICAN AVIATION, INC.
3400 E. 70th Street, Long Beach 5, California

1. PURPOSE

- 1.1 A subroutine has been written to determine the maximum, minimum, and median of a set of numbers, and also to arrange them in order of magnitude, from the maximum to the minimum.

2. METHOD

- 2.1 The program assumes the first value to be the maximum, and subtracts each of the following values from it. If the difference is positive, then the first value is the larger of the two. If the difference is negative, then the second value is the larger of the two; therefore, it is replaced as the maximum. After all values have been subtracted, the true maximum is then established; it is stored in place of the first value. Then, the process is started over again, this time assuming that the second value is the maximum, and continuing from there (the first value obtained is not subtracted this time). This process repeats until only one value is left; it is the minimum.

Now the values are in memory, ranging in magnitude from the maximum to the minimum. The median is the middle value, unless there are an even number of values, in which case the average of the middle two is the median.

3. RESTRICTIONS

- 3.1 Values in memory must be in floating point form.
- 3.2 When relocating this subroutine, the last digit of the new location must be zero, i.e., XXX0.0.

4. USAGE

- 4.1 The calling sequence for this subroutine is:

```

      |
      | SLL
      | TRA L( )
      | PZE N
      |-----|
      | PZE L(N)
      |-----|
      | PZE L(P)
      |-----|
      | return
  
```

4. USAGE (Continued)

4.1 (Continued)

Where $L(N)$ is the location of the values, $L(P)$ is the location in which the maximum is to be put (the median and minimum will be placed in the two locations after $L(P)$), and N is the number of values.

4.2 To relocate this subroutine, set L7730 and enter the new location in the address portion of the second half, i.e., +0000000+00XXX00. Then press "start".

5. CODING INFORMATION

<u>Location</u>	<u>Function</u>
0000 - 0106	Subroutine
3777 - 4106	Relocator Matrix
7730 - 7754	Relocator

5.1 Timing:

$$t \approx [.0356n^2 - n] \text{ seconds}$$