

RECOMP II USERS' PROGRAM NO. 1055

PROGRAM TITLE: RECOMP II KEYBOARD FLOATING POINT INPUT
SUBROUTINE, VARIABLE FORMAT

PROGRAM CLASSIFICATION: Subroutine

AUTHOR: F. Keefe
B. Metivier
Melpar, Inc.
Watertown, Massachusetts

PURPOSE: To input a decimal number from the console
keyboard and convert it to floating binary.
The number may be an integer, fraction, mixed
number, or any of the aforementioned with
decimal exponent.

DATE: 23 January 1961

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

PROGRAM TITLE: Recomp II Keyboard Floating Point Input
Subroutine, Variable Format

1. PURPOSE

1.1 To input a decimal number from the console key board and convert it to floating binary. The number may be an integer, fraction, mixed number, or any of the aforementioned with decimal exponent.

2. RESTRICTIONS

2.1 The input number may be composed of several parts.

- A. The sign of the number (will be assumed positive if no sign is given).
- B. The integral part of the number.
- C. A decimal point.
- D. The fractional part of the number.
- E. Press "ENTER".
- F. The sign and (integral) value of the power of ten by which the number is to be multiplied.
- G. Press "ENTER".
- H. Press "START".

Not all these parts are required for every input. The following combinations are acceptable:

ABCDEFGH, ABCDEH, ABCEFGH, ABCEH, ACDEFGH, ACDEH, BCDEFGH, BCDEH, BCEFGH, BCEH, CDEFGH, CDEH, ~~H~~ (enters previous word over again)

2.2 If an error is discovered before "START" has been pressed, hit the "CLEAR", and start over.

2.3 The digits are displayed as you key them in. Before and after the number is keyed in, "+0" is displayed.

2.4 The program will accept any size number and exponent so long as the exponent does not exceed eleven decimal digits. If the number contains more than fourteen digits, plus a decimal point, you will lose the left-hand digits in the display, but the number will be stored correctly.

2.5 The routine only accepts one input number at a time and exits after "START" has been pressed, leaving result as specified in (4.3).

2.6 No output - the number is stored in memory in the location specified.

Continued.....

2.7 Don't type too fast; you may lose a digit.

3. METHOD

3.1 The mantissa of the resultant floating binary number is accurate to at least 37 bits.

3.2 The number is formed by adding in floating point form each new digit to the already formed number, after adjusting the power of ten.
before decimal point: $10 N + d \rightarrow N$
after decimal point: $10 D \rightarrow D, N + d/D \rightarrow N$

3.3 The final answer is formed from successive multiplications (or divisions) of the result of (3.2) by numbers, P, of the form $10^{(2^k)}$. The binary representation of the exponent is scanned from right to left; as each bit is examined, P is squared. If the bit is a "1", the current answer is multiplied by the new value for P; if not the next bit is examined.

$$N \cdot \left[\prod_{b_k=1} 10^{(2^k)} \right] \rightarrow N$$

4. USAGE

4.1 Entrance - transfer to location 0020.0

4.2 Exit - +TMI xxxxx.x + 57 0144.0 in location 0014;
you specify xxxxx.x. (STA 0014.0)

4.3 DATA LOCATION is specified by programmer in location 0004 in form
+00 0000.0 0 00 yyyy.0. (STA 0004.1)

4.4 Storage Locations
0000 - 0150 Relocatable
Uses both loops.

4.5 No sense switches used.

0000.0 +57.0100.0 TRA
+40.0016.0 ARS

0001.0 +42.0045.1 STA
+40.0015.0 ARS

0002.0 +00.0000.0 ---
-00.0014.0 ---

0003.0 +57.0132.0 TRA
+57.0160.0 TRA

0004.0 +00.0000.0 ---
-00.0000.0 ---

0005.0 +64.0040.0 CTL
+57.7760.0 TRA

0006.0 +64.0050.0 CTL
+57.7760.1 TRA

0007.0 +03.7761.1 SUB
+57.7764.0 TRA

0010.0 +36.7770.1 DIS
+00.0133.0 CLA

0011.0 +41.0041.0 ALS
+71.7761.0 RDY

0012.0 +01.0133.0 ADD
+52.0005.0 TRP

0013.0 +01.0134.0 ADD
+50.7764.1 TRZ

0014.0 +51.0027.1 TRN
+57.0144.0 TRA

0015.0 +57.7765.1 TRA
+30.7772.0 FCA

0016.0 +07.7776.0 FMP
+04.7774.0 FAD

0017.0 +35.7772.0 FST
+57.0006.0 TRA

0020.0 +00.0004.0 CLA
+41.0024.0 ALS

0021.0 +42.0004.0 STA
+00.0135.0 CLA

0022.0 +42.0042.0 STA
+41.0024.0 ALS

0023.0 +42.0043.0 STA
+30.0146.0 FCA

0024.0 +35.0046.0 FST
+00.0136.0 CLA

~~0025.0 +42.0043.1 STA
+42.0015.0 STA~~

0026.0 +66.0030.0 CTV
+64.0010.0 CTL

~~0027.0 +57.7760.0 TRA
+77.0020.0 HTR~~

~~0030.0 +03.1463.0 SUB
+67.3500.0 CFV~~

0031.0 +67.3567.0 CFV
+67.2000.0 CFV

~~0032.0 -00.0000.0 ---
-00.0000.0 ---~~

~~0033.0 -00.0000.0 ---
-00.0000.0 ---~~

~~0034.0 +00.0000.0 ---
-00.0000.1 ---~~

~~0035.0 +00.0000.0 ---
-00.0023.0 ---~~

~~0036.0 +50.0000.0 TRZ
-00.0000.0 ---~~

~~0037.0 +00.0000.0 ---
-00.0002.0 ---~~

0040.0 +50.0075.1 TRZ
+03.0034.0 SUB

0041.0 +50.0026.1 TRZ
+03.0034.0 SUB

0042.0 +50.0140.0 TRZ
+03.0034.0 SUB

0043.0 +50.0021.1 TRZ
+57.0077.0 TRA

0044.0 +64.0060.0 CTL
+57.7760.1 TRA

0045.0 +64.0070.0 CTL
+57.7761.1 TRA

~~0046.0 +40.0000.0 ARS
-00.0000.0 ---~~

~~0047.0 +00.0000.0 ---
-00.0000.1 ---~~

0050.0	+00.0026.1	CLA
	+00.7771.0	CLA
0051.0	+40.0043.0	ARS
	+41.0003.0	ALS
0052.0	+60.7761.0	STO
	+00.7770.0	CLA
0053.0	+51.0007.0	TRN
	+01.7761.1	ADD
0054.0	+41.0004.0	ALS
	+60.7770.0	STO
0055.0	+00.7774.0	CLA
	+41.0006.0	ALS
0056.0	+01.7771.0	ADD
	+41.0004.0	ALS
0057.0	+60.7771.0	STO
	+57.0026.1	TRA
0060.0	+00.0107.0	CLA
	+30.0046.0	FCA
0061.0	+07.7776.0	FMP
	+35.0046.0	FST
0062.0	+30.7774.0	FCA
	+45.0000.0	FNM
0063.0	+05.0046.0	FDV
	+04.7772.0	FAD
0064.0	+35.7772.0	FST
	+57.0006.0	TRA
0065.0	+64.0100.0	CTL
	+57.7760.1	TRA
0066.0	+34.7772.0	FCS
	+57.7763.0	TRA
0067.0	+64.0110.0	CTL
	+57.7760.0	TRA
0070.0	+00.0004.0	CLA
	+01.0137.0	ADD
0071.0	+60.0004.0	STO
	+00.0141.0	CLA
0072.0	+42.0015.0	STA
	+42.0043.1	STA
0073.0	+00.0050.0	CLA
	+42.0042.0	STA

0074.0 +00.0002.0 CLA
+60.7774.0 STO

0075.0 +57.0006.0 TRA
+02.7770.0 CLS

0076.0 +60.7770.0 STO
+57.0026.1 TRA

0077.0 +36.0000.0 DIS
+77.0026.1 HTR

0100.0 +00.0000.0 CLA
+00.0004.0 CLA

0101.0 +42.7763.0 STA
+00.7770.0 CLA

0102.0 +51.0066.0 TRN
+30.7772.0 FCA

0103.0 +35.0000.0 FST
+00.0142.0 CLA

0104.0 +42.0043.1 STA
+42.0042.0 STA

0105.0 +00.0060.0 CLA
+42.0043.0 STA

0106.0 +00.0136.0 CLA
+57.0025.1 TRA

0107.0 +64.0100.0 CTL
+57.7763.1 TRA

0110.0 +00.0131.0 CLA
+03.7773.0 SUB

0111.0 +41.0001.0 ALS
+42.7762.1 STA

0112.0 +00.7772.0 CLA
+40.0000.0 ARS

0113.0 +60.7772.0 STO
+00.0004.0 CLA

0114.0 +40.0024.0 ARS
+42.0121.1 STA

0115.0 +42.0122.1 STA
+57.0116.0 TRA

0116.0 +64.0120.0 CTL
+00.7770.0 CLA

0117.0 +52.7760.0 TRP
+57.0127.0 TRA

0120.0 +00.7772.0 CLA
+33.0034.0 EXT

0121.0 +50.7763.0 TRZ
+30.0000.0 FCA

0122.0 +07.7776.0 FMP
+35.0000.0 FST

0123.0 +00.7772.0 CLA
+40.0001.0 ARS

0124.0 +50.0021.1 TRZ
+60.7772.0 STO

0125.0 +30.7776.0 FCA
+07.7776.0 FMP

0126.0 +35.7776.0 FST
+57.7760.0 TRA

0127.0 +00.0143.0 CLA
+01.7762.0 ADD

0130.0 +60.7762.0 STO
+57.7760.0 TRA

0131.0 +00.0000.0 ---
-00.0023.1 ---

0132.0 +60.0004.0 STO
+57.0021.1 TRA

0133.0 -00.0000.0 ---
-00.0015.0 ---

0134.0 +00.0000.0 ---
-00.0005.0 ---

0135.0 +00.0140.0 CLA
+00.0021.1 CLA

0136.0 +00.7765.1 CLA
+00.0077.0 CLA

0137.0 +00.0002.0 CLA
-00.0000.0 ---

0140.0 +64.0070.0 CTL
+57.7761.1 TRA

0141.0 +00.0044.0 CLA
+00.0065.0 CLA

0142.0 +00.0045.0 CLA
+00.0067.0 CLA

0143.0 -02.0000.0 ---
-00.0000.0 ---

0144.0 +41.0001.0 ALS
+60.7774.0 STO

0145.0 +57.7765.0 TRA
+00.0014.0 CLA

0146.0 +40.0000.0 ARS
-00.0000.0 ---

0147.0 +00.0000.0 ---
-00.0000.1 ---