

FORTTRAN II PROGRAM FOR SORTING, SUMMING,
AND AVERAGING USING AN IBM 1620 COMPUTER

KGS
OF
63-1

by

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INTRODUCTION

This sorting, summing, and averaging program may be used by the geologist to separate geologic data into discrete classes and obtain sums and averages for the data with each class. The user can separate the data into as many sets as desired and sum and average as many different types of data within a class as desired. For example, oil-field data such as porosity, gas-oil ratio, and total production - may be summed and averaged after having been sorted by company, type of trap, year discovered, etc.

The program is designed to sort nine sets of data according to eleven different sorting variables and simultaneously sum and average all nine sets for each of the sorting variables. The program may be readily altered, however, to handle "N" sorting variables and "M" sets of data simultaneously.

Data having a zero value are not included in the total and average values. The program is also designed such that if there is a zero value for a sum of one set of data for a given sorting category within one of the sorting variables, there is no answer given in the tabular output.

The entire program performs in fixed point arithmetic, but may be altered to utilize floating point arithmetic by altering the names of the data sets and the counter (Fig. 1; Table 1).

NOMENCLATURE

I/O I/O	I	Indicates the data card being operated upon
0	IAVE (L)	The average for a given set of data (L) sorted according to a given sorting category.
I	IDATA (L, I)	This array contains the data sets which are to be sorted, summed, and averaged. "L" indicates the data set and "I" indicates a particular datum within the set.
I	INCRE	The highest value corresponding to a data set within the program.
I	INDCR	The highest value corresponding to a sorting variable set within the program.
I-0	IN	The particular sorting variable which is being operated upon in the program during one simultaneous sorting, summing, and avera-

Table 1.--Listing of FORTRAN II statements in sum, sort,
and average program.

*0809

```
1 READ 2, N
2 FORMAT (I5)
  PUNCH 4
4 FORMAT (50H      AVERAGE          SUM      INDEX PAR DATA COUNT)
  DIMENSION ISORT(11,200),IDATA(9,200)
  READ 6, INDCR, INCR
6 FORMAT (2I5)
  DO 11 I=1,N
9 READ 10, ID,IL,ISORT(1,I),ISORT(2,I),ISORT(3,I),IDATA(1,I),
  1ISORT(4,I),ISORT(5,I),ISORT(6,I),ISORT(7,I),ISORT(8,I),IDATA(2,I),
  2ISORT(9,I),ISORT(10,I),IDATA(3,I),IDER,IDATA(4,I),IDEAD,
  3IDATA(5,I),IDATA(6,I),IDATA(7,I),IDATA(8,I),ISORT(11,I),IDATA(9,I)
10 FORMAT(2A4,A2,I2,I4,I2,2A2,2A1,A2,I2,A2,A3,2I3,I2,A2,I4,I6,I9,I7,
  1A3,I8)
11 CONTINUE
  DIMENSION IPAR(49),ISUM(9),J(9),IAVE(9)
12 READ 13,IN,IS
13 FORMAT (2I5)
  IF (IN-INDCR) 14,14,1
14 READ 15,(IPAR(K),K=1,IS)
15 FORMAT (I9)
  DO 22 K=1,IS
  DO 16 L = 1,INCR
  J(L)=0
16 ISUM(L)=0
  DO 19 I=1,N
  IF (ISORT(IN,I)-IPAR(K)) 19,17,19
17 DO 19 L = 1,INCR
  IF (IDATA(L,I)) 18,19,18
18 J(L)=J(L)+1
  ISUM(L)=ISUM(L)+IDATA(L,I)
19 CONTINUE
  DO 22 L=1,INCR
  IF (J(L)) 22,22,20
20 IAVE(L)=ISUM(L)/J(L)
  PUNCH 21,IAVE(L),ISUM(L),IN,K,L,J(L)
21 FORMAT (2I15,4I5)
22 CONTINUE
  GO TO 12
  END
```

I	IPAR (K)	ging process.
I	IPAR (K)	The categories within the particular sorting variable upon which the program sorts the data sets.
I	IS	The number or sorting categories within a particular sorting variable.
I	ISORT (IN,I)	This array contains the sorting categories corresponding to the data which are to be sorted, summed, and averaged. The "I" corresponds exactly to the "I" in the IDATA array. These are read in, in conjunction with the IDATA array.
O	ISUM(L)	The sum for a given set of data (L) sorted.
O	J (L)	The counter which counts the number within a data set belonging to a given sorting category as they are determined within the program.
O	K	The value assigned to a particular sorting category within a sorting variable where K varies from 1 to IS.
O	L	The value assigned to a particular data set within the program, where L varies from 1 to INCRE.
I	N	The maximum number of data points read into the ISORT and IDATA arrays. Defines max value of I.

INPUT SPECIFICATIONS

1. The first card contains the maximum number of data cards to be read in, N, right hand justified in columns 1 through 5.
2. The second card contains the maximum number of sorting variables, not categories, right hand justified in columns 1 through 5 and the maximum number of data sets right hand justified in columns 6 through 10.
3. The next N cards are the data, with corresponding sorting variables, which are to be sorted, summed, and averaged. Their format is determined by the user and specified in the program.
4. The parameter deck follows the data deck. The parameter deck is comprised of small sets of input parameters of the following form:

The first card in the set contains, in columns 1 through 5, the number, IN, of the particular sorting variable. Columns 6 through 10 contain the maximum number of categories, IS, for the particular variable.

The next "IS" cards are the sorting categories for the particular sorting variable, right hand justified if numeric and left hand justified if alphameric, in columns 1 through 9.

Table 2.--Listing of input data.

ANDERSPEED541112	MOPRHSST48GESUS001	18005000024390	0160343GRW06893457
ANDRCHWPLE551213	MOABSSST56GESEI001	26SW2990	0008835CON00100602
ATOKAPENED57091010	MOPRHSST56GESUS05115831SW3700090840		0061900STA05665849
BAGLPENNLE51091006	DMPRSLSC56GC 00116320SW3254000000		0383111SHE08349446
BAGUPENNLE55091006	DMPRSLSC63GCRAN 15015002930028390		0078558TPC05068016
BANDPTPEED59091008	MOPRBSCO GESEI 12514SW3200000000		-000000HOR00023817
BELLKPELE58141505	MOPRBSSC GESUS 18728 6603000000		-000000CON00433865
BLACKRPEED581112	MOPRBSST GESUB 32		-000000ONE00134230
BLUITTWCRO59080908	WCPRSLSC72SGSEI00513550 3020027000		0001349BRG00023502
BUFFALOPELE58131407	MOPRHSST54GESUS 17035SW6330012500		0073592PAN01463486
BURTONPNED60101107	MOPRHSST52GESEI 16519BW5625014000		0000369SDX00061752
CEDARLMOED611112	MOPRH 59GE 26 2100022324		0002474ODE00084262
CRAWFDPEED571112	MOPRBSST42GESUS 19439 4850108000		-000000UNI00735610
DUFFLDPEED52080909	MOPRHSST54GESEI 56 3065		15535CON04003085
EMPIREPEED53101112	MOPRHSST60GESEI 15625SW3014044607		0143587PAN08919696
FRENPNED54111209	MOPRHSST51SGSEI12516015SW4970001180		0132345SKL04835702
GRAYBGATED571011	MOPRHS 56GE 80 3252028300		0095142ELP02764732
HARKEYPEED581011	MIPRBLCO GESUS 16093 4000		-000000TEN00078544
LEAPENNSLE61131411	MOPRHSSC55GESEI 17720SW6691010782		0003511USS00069772
LOSMEDATED58121306	DEPRBSST56GESUS 19609SW8371086012		0008101SHE00733633
MESCALNPLE561011	DEPRSSST50GESEI 16511002258		0003900SDX00238227
MOORWOLFLE52080908	WCPRSLSC60GCSEI 45 2850017000		0062873AME01827144
REDLAKPEED56091008	MOPRHSST53GESEI00215322 1450209000		0016132HOR04505240
SALTLSATLE58121307	MOPRHSST48GESUS 07001681037375		0028853TEX01047744
SALTLSMOLE60121310	MOPRHSST53GESEI05019539000500030930		0019249TEX00560622
SHUGRTPEED58101109	MOPRHSST60GEOWR00314349SL4855022300		0141828PAN03773585
TONTOPEWLE60131410	MOPRHSST52GESEI 53SW0640060000		0002296PAN00113146
TVPENNSYCH60101109	MOPRSSST51GEOWR01519033BR4800015000		0023620ROB00436682
WELCHPENED56121308	MOPRBLST58SGSEI 18006 3551		-000000ELP00768679
WHITECTYED60091007	MIPRBLCO58GESEI 14810 4384		0000296GUL00151401
UNDCONBLE54121306	DESIB CO50GESEI 178 SW6092		0014892CON00164080
UNDEPMESLE611314	MOABH GESEI 37 4052007224		0001339ELP00055535
UNDHORFELE521213	MOABSSST51GESEI 30 0400017686		HOR00082565
UNDLAWSTLE521112	DEABSSSC53GESEI 15040SW1600011700		0002754LAW00038351
UNDPAMADED541112	MOABHSST48GESEI 24SW4380		0000865PAN00139505
UNDWNGASLE541213	MOPRSSCO58GESEI 16040006792020000		0015584WNG00758452
ALLISONPLE54091009	WCPRSLCO48SGSEI20015517SW3363001346027348926		GUL09922742
ANDRCHWCLE53091010	VIPRSLSC42SGSEI11414050SW3731000313008880718		CON04541035
ANDRCHPELE541213	VIABSDSC38WAOWR 10SW -00000000000167		CON-0000000
ANDRCHEPLE57101104	VIABSLSC40SGSUS00115224 0060001732000010314		HOR00016726
APACHESpch55070808	WCABSLST42WASUS00113407SW1900001094000004815		ATL-0000000
BAGLEYPELE49091007	VIPRSLCO47SGSEI00114845SW3290002700003334361		AME09597584
BAGLYLPNLE57101106	DMPRSLST53SGSUS 14520SW3775003091000175374		TPC00313491
BAGLEYEWLE55091008	WCABSLCO43SGSEI00112917SW3680001200000018760		SDX00010823
BAUMWOLFLE55091008	VIPRSLCO43SGSUB 15020SW0150001141000180735		CHA00128224
BOUGHPPPELE49091013	WCISLCO44SGSEI03016020SW3588001604004499667		MAG06340156
BRONCOWCLE53091013	VIPRSLCO41SGSEI04513825 3640001037001795218		AME00420602
BUFFALOWLE54101108	WCPRHLSC38SGSEI 15528SW3700001052000103361		PANOC036558
CANYONWCED59050609	WCPRHDST45WASEI 12 0300 000042445		CNE-0000000
CAPRKEWCLE53080910	WCPRSLCO44SGSUB 12713SS2895001190000630481		HAM00396230
CAPRKEPELE52101108	DEABSLCO48WASUB 15409 1099005060000022818		TEX-0000000
CASSPENNLE44070811	DMPRPLSC40SGSUS 14535SW3146000196003855096		CON01657352
CAUDILWCLE56101108	WCPRSLSC42SGOWR00115522 3020000930001626648		MAG00854485
CAUDILPELE51111208	MIABSLSC45WASEI 25 0040000930000001651		MAG-0000000
CEDARLATED61101107	MIPRHD 42SG 08 001894000041085		SIN00017774
CHAMBRWCLE55101106	WCPRSLSC44SGSEI03617834SW3827001195000327080		ATL00235115
CROSSRDPLE49091007	VIPRSLCO49SGSEI 16412SW. 001663002297972		MAG02489458
DEANPPENLE55111205	DMPRSLCO44SGOWR00316938SW4134001665006365943		SIN08512237
DENTONWCLE50091010	WCPRSLSC45SGSUS01315453SS3820000164038460935		ATL08767847
DENTONSWLE60091009	WCPRSL 44SGSUB 14708SS0080000655000058053		MAG00012368
DICKINSPLE57101107	DEABSLCO43SGSUS 16140SW0075002509000087826		MAG00068650

ECHOLWLCLE60091009WCPRSLSC42SGOWR	14510SW2560000584000032879	CIT00003535
EIDSONPELE53101109WCPRSLST41SGSEI020	15835SW4064001892002592246	SKL03777102
EMPIREWCED54070808WCABHLST41SGSEI	11817SW2435000432000045916	PAN00053280
FIELDRWCLE56091007WCPRSLC042SGSEI	14BR3200000310000081540	FLD00015465
FOURLKPELE56101110VIPRSLSC43SGSUS060	16316SW3803002386001051488	HOR01048323
GLADLAWCLE51091008WCPRSLC042SGSEI	35 3672001600004354085	SIN02934851
GLADASWCLE55091008WCPRSDC038SGSEI	15526SW2982000800000163094	SDX00050457
GLADSWPELE61111207DEPRSSSC54SGOWR	16305BW0525001975000122890	NEI00148131
HIGHTWPPELE50080910WCPRSLSC70SGSEI	14430 3130000875000959892	AME04035519
HIGHTWEPELE59101107VIPRSDST41SGSUS	26 3140000477000136011	SAN00052540
JENKINWCLE60091007WCPRSLSC48SGSEI020	18015SW0525001214000183772	SUN00148657
KEMNTZWCLE56101109VIPRSLST39SGSUS009	15832SW3788001623015076449	TEN13103336
KEMNTZCILE57111208MIPRSDST43SGSUB016	16330SW6911001140000501593	PUR00571760
KEMNTZPELE56111208MIPRSD 44SGSEI	50 1100000932000304744	SIN00375712
KINGWOLFLE51101108VIPRSLC036SGSEI	15807SW3948000734000625052	FOR00562881
KINGPENNLE60091004MIPRSLC037SGSUB038	15225SW3713000870000027533	CBT00018359
KNOWLWCSLE611011 WCABB 39 SEI	99 4055000848000002245	GUL00001925
LANEPENNLE56091003VIPRSLSC50SGSEI009	16218SW3537001980000611850	SDX00596883
LANEWOLFLE55091011VIPRSLSC50SGSEI100	16213SW3516002000001449725	SDX01540524
LAZYJPENLE52091006VIPRSLSC43SGSEI008	14620BR3546001200004154696	GUL04701936
LEAMEXWCLE58101107WCPRHLC037SGSEI	13354BR4048001003000260939	PHI00027374
LEAMEXPELE56111207MIPRHLCO37SGSEI	13636SL0150001061000524886	PHI00485594
LLLAKEPECH591011 MOABS 48	30 4820003200000000930	TEX-0000000
LOCOHLWCED600809 WCABH 42WASUS	0300 751	TRI-0000000
LONEWOLFCH53070811VIPRSLST42SGSEI	12919 3068001220000168153	FOR00179546
LOVTONWCLE52101109WCABHLCO40SGSUB	15005SW3727000719000080535	SHE00158598
LOVTNEPELE51111207DMPRHLC043SGSEI002	16830BW3327001092002484240	TID01780219
LUSKSTRALE60111207DMPRH 48WASEI017	16138 5810003084000262330	ELP-0000000
MALJAMWCLE61101109WCPRHLST42SGSUS	15210SW2638000927000082938	AZT00020255
MALJAMSTLE60111207VIABHLCO51SGRAN	22610SW6210001022000050631	CON00031985
MESCALPELE52080908VIPRSLSC46SGSUS018	16316SW0325000432001134480	JDR00876613
MESCLNWCLE60080909WCPRSLC043WASUS013	14215SW3011001074000097000	CAB-0000000
MILNSDPERO56091004WCPRSLC047SGSEI010	13414SW3320001570000935499	MAG01075790
MOOREPENLE52091007DMPRSLSC48SGSUB	16408003411002454000065718	TEX00362865
NEWHOPEPRO51080905MIABSLST48SGSEI	15011SW2590001615000006806	MAG00013683
PEARLPENLE59121307MOPRHSST43SGSEI	16424SW0325004700000071281	SHE00098006
PENSCOWCED60050606WCPRHLST45SGSEI	10510SL0700001345000024775	PAN00023647
PRARIESPRO60091004WCPRSL 42SG 194	07 001600000728757	COS00751164
QUERPLPELE57111207DMPRHLC042SGSEI025	17150SW0050001621000339091	SHE00440948
RANGLKPELE56101110VIPRSLC041SGSEI028	16233BR3620000796005853593	PTP02334329
REEVESPELE56101110DMPRHSSC45SGSEI	17110004650001432000882312	CIT00765918
REMUDAWCED60111209WCPRBLSC47SGSEI	14043BR0100 000026355	TEX00018139
SANMALPELE57111207MISIHL 42SG	14 0500001036000010433	PEN00035361
SAUNDRPPELE50091010VIPRSLSC43SGSEI	14630SW3523001400030285766	GUL32954759
SAUNDRSPLE51101108VIPRSLC036SGSUS001	15022SW2600000820000376888	LAW00095413
SCHARBPELE601314 MOABHSST54SGSEI	24423006640 000004396	OHI00049040
SHOEBARPLE54101110WCPRHLST44SGSEI	55SW1000000879000423373	WNG00046780
SHOEBRNPLE58101107DMPRHLST43SGOWR	26SW1100001227000068494	SIN00053899
SHUGRTWCED61091009WCPRHLSC42WASEI	14210SW3690001166000059753	PAN00017642
SPENCERPLE610910 WCABHLCO44SGSUB	16660003825000700000001011	WMS00000113
SQUYRESPRO61080907VIPRSLC045SGSUB	10SW3388000363000019635	CAM00003851
SRRPENNSLE550910 MIABSLSC49SGSEI	16210SW3185003160000036727	AME00163497
TATUMWLCLE57101110WCPRSLSC43SGSUS012	19 3930002100001234617	UNI00367314
TONTODWCLE601112 WCABHLST40SGSEI	29000020000041000001913	CON00001485
TOWNSDWCLE52101108WCPRSLST40SGSEI038	15636BR3950002003023492794	WIL45596692
TULKWOLFLE51091008VIPRSLC042SGSEI	16125BR3470001178001824917	TEX01955195
TULKNWLCLE520910 VIABSLSC41WASUS	14410BR3025001500000004679	PHI-0000000
VACUMSWCLE60101109WCPRHLC038SGOWR	16 000069195	SIN00022728
WILLMSPELE551112 DEABSSST48WASEI	16117SW4187003089000082228	SUP-0000000
WILLMSPNLE611112 DEPRS 48 SEI	10 4186005640000050686	HOR00008374
UNDAMMATLE57080909WCPRSLSC46SGSEI	16 0675002819000083750	AME00263901

UNDEPMRULE611314	MOABH	SEI	12	6545	000010866	ELP0000526
UNDFORSTLE581112	MIABS	42WA	73	0750001349000002594		FOR-0000000
UNDHORSSLE561011	DMABSLSC39WASUB		34SW		350	HOR-0000000
UNDLAWSTLE531112	DMABHLST42WASEI		15534BW1100001243000004200			LAW-0000000
UNDSHHENED60080906	WCPRHLC043SGSEI01712610SW3410001377000051483					SHE0009665
UNDSHHENED61091007	VIPRHLC042SGSEI02012618SW3390000595000053618					SHE0002735
UNDSHHENED61080907	VIPRHLC041SGSEI00212630SW3390001501000053129					SHE0001569

Table 3.--Listing of parameter cards.

1 4
 534500000
 454400000
 434800000
 595600000

2 14
 44
 49
 50
 51
 52
 53
 54
 55
 56
 57
 58
 59
 60
 61

3 9
 0506
 0708
 0809
 0910
 1011
 1112
 1213
 1314
 1415

4 6
 664300000
 654900000
 544900000
 445400000
 444500000
 545600000

5 3
 575900000
 414200000
 624900000

6 4
 620000000
 420000000
 480000000
 570000000

7 5
 530000000
 440000000
 620000000

8 5
 624300000
 626300000
 435600000

9 4
664100000

474300000

624700000

474500000

10 5

624549000

626442000

594155000

626462000

566659000

12 2

Table 4.--Listing of output data.

AVERAGE	SUM	INDEX	PAR	DATA	COUNT
8	619	1	1	1	73
45	4036	1	1	2	89
29	931	1	1	3	32
26	2427	1	1	4	91
2931	249218	1	1	5	85
4390	360001	1	1	6	82
2667425	202724369	1	1	7	76
49953	699347	1	1	8	14
2610883	214092423	1	1	9	82
8	161	1	2	1	20
49	1241	1	2	2	25
24	222	1	2	3	9
29	837	1	2	4	28
3247	87682	1	2	5	27
55242	994369	1	2	6	18
39931	399310	1	2	7	10
59916	778917	1	2	8	13
1713191	44542971	1	2	9	26
9	28	1	3	1	3
45	135	1	3	2	3
8	16	1	3	3	2
19	59	1	3	4	3
3256	9768	1	3	5	3
5771	17314	1	3	6	3
57966	173898	1	3	7	3
23620	23620	1	3	8	1
308114	616228	1	3	9	2
5	28	1	4	1	5
50	254	1	4	2	5
69	209	1	4	3	3
18	92	1	4	4	5
3079	12318	1	4	5	4
6429	32148	1	4	6	5
422674	1690697	1	4	7	4
1349	1349	1	4	8	1
373598	1867991	1	4	9	5
11	11	2	1	1	1
40	40	2	1	2	1
35	35	2	1	4	1
3146	3146	2	1	5	1
196	196	2	1	6	1
3855096	3855096	2	1	7	1
1657352	1657352	2	1	9	1
9	27	2	2	1	3
46	140	2	2	2	3
15	31	2	2	3	2
25	77	2	2	4	3
3439	6878	2	2	5	2
1989	5967	2	2	6	3
3377333	10132000	2	2	7	3
6142399	18427198	2	2	9	3
10	30	2	3	1	3
52	158	2	3	2	3
13	13	2	3	3	1
37	113	2	3	4	3
3491	10473	2	3	5	3
813	2439	2	3	6	3
23235531	69706593	2	3	7	3
15252708	45758125	2	3	9	3
7	58	2	4	1	8

43	348	2	4	2	8
1	4	2	4	3	3
21	175	2	4	4	8
2862	22901	2	4	5	8
1138	7969	2	4	6	7
1381948	9673639	2	4	7	7
3831111	3831111	2	4	8	1
2241669	15691688	2	4	9	7
11	95	2	5	1	8
47	524	2	5	2	11
21	64	2	5	3	3
25	275	2	5	4	11
2454	26998	2	5	5	11
5975	59754	2	5	6	10
4136531	28955720	2	5	7	7
27054	81162	2	5	8	3
6405316	57647849	2	5	9	9
10	65	2	6	1	6
44	312	2	6	2	7
59	179	2	6	3	3
28	201	2	6	4	7
3073	21512	2	6	5	7
7357	51502	2	6	6	7
2345169	14071016	2	6	7	6
143587	143587	2	6	8	1
3039035	18234211	2	6	9	6
8	50	2	7	1	6
46	464	2	7	2	10
108	326	2	7	3	3
24	224	2	7	4	9
4192	37732	2	7	5	9
7039	49279	2	7	6	7
5584348	27921743	2	7	7	5
64805	324029	2	7	8	5
2538950	22850556	2	7	9	9
7	60	2	8	1	8
47	520	2	8	2	11
23	142	2	8	3	6
20	223	2	8	4	11
3043	33481	2	8	5	11
4373	43734	2	8	6	10
958789	8629107	2	8	7	9
43696	87393	2	8	8	2
1756610	15809496	2	8	9	9
7	92	2	9	1	12
45	630	2	9	2	14
17	119	2	9	3	7
22	318	2	9	4	14
2880	37447	2	9	5	13
20183	222020	2	9	6	11
2449941	26949359	2	9	7	11
10016	20032	2	9	8	2
2012921	26167981	2	9	9	13
7	68	2	10	1	9
46	506	2	10	2	11
21	105	2	10	3	5
33	363	2	10	4	11
2525	27778	2	10	5	11
22108	243188	2	10	6	11
305374	2442998	2	10	7	8
78521	157042	2	10	8	2

2541237	27953616	2	10	9	11
6	48	2	11	1	7
48	340	2	11	2	7
3	3	2	11	3	1
40	406	2	11	4	10
4193	37738	2	11	5	9
23109	161766	2	11	6	7
110675	332027	2	11	7	3
63093	252374	2	11	8	4
860706	7746360	2	11	9	9
7	39	2	12	1	5
50	201	2	12	2	4
3	6	2	12	3	2
37	225	2	12	4	6
1697	10185	2	12	5	6
92294	369177	2	12	6	4
83245	249737	2	12	7	3
1349	1349	2	12	8	1
49466	197866	2	12	9	4
7	129	2	13	1	17
46	930	2	13	2	20
45	364	2	13	3	8
21	413	2	13	4	19
2723	49028	2	13	5	18
8853	132796	2	13	6	15
107988	1619823	2	13	7	15
9166	45830	2	13	8	5
147139	2501368	2	13	9	17
8	64	2	14	1	8
46	509	2	14	2	11
11	22	2	14	3	2
23	307	2	14	4	13
3318	29864	2	14	5	9
4849	53345	2	14	6	11
44747	447475	2	14	7	10
2441	7324	2	14	8	3
36602	475834	2	14	9	13
7	15	3	1	1	2
45	90	3	1	2	2
11	22	3	1	4	2
500	1000	3	1	5	2
1345	1345	3	1	6	1
33610	67220	3	1	7	2
23647	23647	3	1	9	1
9	38	3	2	1	4
41	165	3	2	2	4
1	1	3	2	3	1
19	78	3	2	4	4
2637	10549	3	2	5	4
735	2942	3	2	6	4
1018495	4073980	3	2	7	4
630059	1890178	3	2	9	3
8	96	3	3	1	12
50	654	3	3	2	13
9	56	3	3	3	6
30	401	3	3	4	13
2303	32249	3	3	5	14
32687	392246	3	3	6	12
303740	3037407	3	3	7	10
26585	79757	3	3	8	3
1050534	11555880	3	3	9	11

7	251	3	4	1	32
46	1564	3	4	2	34
47	857	3	4	3	18
21	747	3	4	4	35
3101	102350	3	4	5	33
11435	365934	3	4	6	32
4549343	131930964	3	4	7	29
107999	539997	3	4	8	5
3332754	113313657	3	4	9	34
9	255	3	5	1	27
44	1364	3	5	2	31
20	223	3	5	3	11
31	1020	3	5	4	32
3226	90346	3	5	5	28
5878	158712	3	5	6	27
2123095	53077377	3	5	7	25
68074	408446	3	5	8	6
3390207	101706214	3	5	9	30
7	96	3	6	1	13
46	1061	3	6	2	23
27	189	3	6	3	7
30	726	3	6	4	24
2627	57814	3	6	5	22
9262	194514	3	6	6	21
652178	11087038	3	6	7	17
59756	298781	3	6	8	5
1330055	25271063	3	6	9	19
7	52	3	7	1	7
50	553	3	7	2	11
17	52	3	7	3	3
21	213	3	7	4	10
3372	33722	3	7	5	10
28233	197633	3	7	6	7
566032	1698096	3	7	7	3
15919	95514	3	7	8	6
516886	5168869	3	7	9	10
9	28	3	8	1	3
53	215	3	8	2	4
30	180	3	8	4	6
4870	24353	3	8	5	5
22626	90506	3	8	6	4
7631	15262	3	8	7	2
20184	80738	3	8	8	4
292706	1756240	3	8	9	6
5	5	3	9	1	1
28	28	3	9	4	1
6603	6603	3	9	5	1
433865	433865	3	9	9	1
9	330	4	1	1	36
44	1740	4	1	2	39
38	611	4	1	3	16
24	917	4	1	4	38
2620	96955	4	1	5	37
2327	81460	4	1	6	35
2951081	109190033	4	1	7	37
32111	64222	4	1	8	2
2512403	87934116	4	1	9	35
8	186	4	2	1	23
42	1072	4	2	2	25
29	416	4	2	3	14
21	541	4	2	4	25

3137	72158	4	2	5	23
1242	29813	4	2	6	24
3177209	79430245	4	2	7	25
4086263	93984068	4	2	9	23
6	61	4	3	1	9
44	487	4	3	2	11
27	54	4	3	3	2
33	397	4	3	4	12
2483	27323	4	3	5	11
1343	12093	4	3	6	9
145805	1458052	4	3	7	10
296	296	4	3	8	1
191168	1911685	4	3	9	10
7	79	4	4	1	11
46	606	4	4	2	13
9	48	4	4	3	5
27	358	4	4	4	13
3057	36687	4	4	5	12
4135	45495	4	4	6	11
1318468	14503148	4	4	7	11
230834	461669	4	4	8	2
2730439	27304391	4	4	9	10
6	34	4	5	1	5
50	402	4	5	2	8
18	131	4	5	4	7
3025	24207	4	5	5	8
18390	110345	4	5	6	6
78940	315762	4	5	7	4
7411	29647	4	5	8	4
231845	1391072	4	5	9	6
8	146	4	6	1	17
53	1272	4	6	2	24
27	249	4	6	3	9
32	913	4	6	4	28
3614	97604	4	6	5	27
55545	1110914	4	6	6	20
37838	75677	4	6	7	2
49792	946060	4	6	8	19
1797155	48523186	4	6	9	27
8	738	5	1	1	88
46	4363	5	1	2	93
33	1343	5	1	3	40
26	2549	5	1	4	97
3190	290336	5	1	5	91
11896	999339	5	1	6	84
2985000	199995045	5	1	7	67
61439	1474548	5	1	8	24
2519990	236879117	5	1	9	94
7	72	5	2	1	10
44	1167	5	2	2	26
1	4	5	2	3	4
27	733	5	2	4	27
2427	58270	5	2	5	24
3088	64853	5	2	6	21
20130	483129	5	2	7	24
3448	13793	5	2	8	4
983383	17700899	5	2	9	18
8	26	5	3	1	3
45	136	5	3	2	3
15	31	5	3	3	2
44	133	5	3	4	3

2595	10380	5	3	5	4
113213	339640	5	3	6	3
2255050	4510100	5	3	7	2
14892	14892	5	3	8	1
2179865	6539597	5	3	9	3
8	490	6	1	1	58
46	3221	6	1	2	70
32	1062	6	1	3	33
23	1661	6	1	4	70
2873	186749	6	1	5	65
3488	226769	6	1	6	65
3196642	194995198	6	1	7	61
64509	580584	6	1	8	9
3392606	206948993	6	1	9	61
7	49	6	2	1	7
50	350	6	2	2	7
37	373	6	2	4	10
4572	41151	6	2	5	9
64953	194860	6	2	6	3
14300	28600	6	2	7	2
7763	23289	6	2	8	3
294902	3243923	6	2	9	11
8	286	6	3	1	35
46	2055	6	3	2	44
24	316	6	3	3	13
29	1346	6	3	4	46
2907	127940	6	3	5	44
25179	982007	6	3	6	39
210668	6109380	6	3	7	29
52903	899360	6	3	8	17
1173079	49269345	6	3	9	42
11	11	6	4	1	1
40	40	6	4	2	1
35	35	6	4	4	1
3146	3146	6	4	5	1
196	196	6	4	6	1
3855096	3855096	6	4	7	1
1657352	1657352	6	4	9	1
8	615	7	1	1	74
44	3586	7	1	2	80
31	1096	7	1	3	35
24	1973	7	1	4	81
2752	211905	7	1	5	77
2259	167216	7	1	6	74
2734526	202354996	7	1	7	74
105237	526187	7	1	8	5
2839694	210137428	7	1	9	74
7	47	7	2	1	6
41	291	7	2	2	7
16	16	7	2	3	1
24	174	7	2	4	7
2886	14433	7	2	5	5
837	3349	7	2	6	4
169877	1189139	7	2	7	7
213648	1068243	7	2	9	5
8	161	7	3	1	19
52	1461	7	3	2	28
27	249	7	3	3	9
30	973	7	3	4	32
3662	113544	7	3	5	31
49699	1192798	7	3	6	24

232621	1163107	7	3	7	5
45635	958341	7	3	8	21
1653150	49594504	7	3	9	30
8	244	8	1	1	30
47	1622	8	1	2	34
28	398	8	1	3	14
23	832	8	1	4	35
2907	95948	8	1	5	33
4335	130061	8	1	6	30
3415988	95647669	8	1	7	28
88692	532156	8	1	8	6
3117504	96642645	8	1	9	31
9	280	8	2	1	30
48	1929	8	2	2	40
23	333	8	2	3	14
27	1151	8	2	4	42
3079	126261	8	2	5	41
33495	1138858	8	2	6	34
2150310	43006200	8	2	7	20
49491	841350	8	2	8	17
2950476	109167641	8	2	9	37
7	270	8	3	1	35
43	1567	8	3	2	36
27	436	8	3	3	16
25	958	8	3	4	37
3300	118833	8	3	5	36
1876	61921	8	3	6	33
1966978	64910301	8	3	7	33
10257	30772	8	3	8	3
1422134	51196858	8	3	9	36
8	58	9	1	1	7
43	605	9	1	2	14
10	31	9	1	3	3
22	294	9	1	4	13
2101	25212	9	1	5	12
1958	19589	9	1	6	10
41841	585781	9	1	7	14
17642	17642	9	1	9	1
6	20	9	2	1	3
59	179	9	2	2	3
1	1	9	2	3	1
26	80	9	2	4	3
3011	9034	9	2	5	3
22695	45390	9	2	6	2
174847	524542	9	2	8	3
5081535	15244606	9	2	9	3
8	617	9	3	1	74
44	3462	9	3	2	78
35	1222	9	3	3	34
24	1875	9	3	4	78
2863	211865	9	3	5	74
1676	122395	9	3	6	73
2725161	204387136	9	3	7	75
66847	133694	9	3	8	2
2584747	201610275	9	3	9	78
8	141	9	4	1	17
53	1333	9	4	2	25
15	124	9	4	3	8
34	1045	9	4	4	30
3762	112875	9	4	5	30
57617	1209970	9	4	6	21

35208	844997	9	4	8	24
1474384	44231530	9	4	9	30
8	515	10	1	1	59
47	3343	10	1	2	71
34	927	10	1	3	27
28	2082	10	1	4	74
2956	209926	10	1	5	71
14009	882596	10	1	6	63
2499801	132489505	10	1	7	53
24761	445711	10	1	8	18
2438777	168275670	10	1	9	69
7	70	10	2	1	9
43	475	10	2	2	11
27	54	10	2	3	2
21	254	10	2	4	12
2919	29199	10	2	5	10
1429	14292	10	2	6	10
144405	1588462	10	2	7	11
178659	1786598	10	2	9	10
6	13	10	3	1	2
57	114	10	3	2	2
12	25	10	3	4	2
4570	9140	10	3	5	2
14706	29412	10	3	6	2
50631	50631	10	3	7	1
78558	78558	10	3	8	1
2550000	5100001	10	3	9	2
7	151	10	4	1	19
44	983	10	4	2	22
16	180	10	4	3	11
26	605	10	4	4	23
3327	79871	10	4	5	24
18059	379242	10	4	6	21
3861853	61789661	10	4	7	16
66557	332789	10	4	8	5
3007466	60149322	10	4	9	20
7	63	10	5	1	8
45	412	10	5	2	9
5	22	10	5	3	4
23	209	10	5	4	9
2999	20994	10	5	5	7
6240	43681	10	5	6	7
1183745	8286216	10	5	7	7
82724	165448	10	5	8	2
1725660	13805282	10	5	9	8

Output Form and Interpretation

The output is in the following form:

The 1st card is a heading for the table. All following cards have the form:

- Columns 1 - 15 The average for a particular data set sorted into a particular category within a sorting variable.
Columns 16 - 30 The sum for the above average.
Columns 31 - 35 The number of the sorting variable being used.
Columns 36 - 40 The number of the sorting category within the sorting variable being used.
Columns 41 - 45 The number of the data set which was sorted, summed and averaged.
Columns 46 - 50 The number of pieces of data which were entered into the sum, hence the divisor for the average.

SAMPLE PROBLEM

The sample problem used the sort, sum, and average program for selected oil-field data. The input (Table 2) 130 data cards, 11 sorting variables, and nine data sets. The parameters (Table 3) indicate, for example, only the first ten sorting variables were used and the eleventh was omitted.

The output (Table 4) shows the tabular listing of the sums and averages and reference to the master list allows interpretation of the index, parameter (Par), and data columns to determine the sorting variable, sorting category, and data set correspondence. For example, where the index equals 1 and Par equals 2, the sort was done by counties and the particular county was Eddy (ED).

MASTER LIST

In order to interpret the output it is necessary for the user to make a master list which shows the correspondence between the sorting variables, sorting categories within the variables, data set being sorted, summed, and averaged, and the numbers listed under the index, par, and data headings. Such a master list is shown in the sample problem.

Data - Corresponding data set

- 1 - Porosity
- 2 - API gravity
- 3 - Permeability
- 4 - Net pay
- 5 - Initial pressure
- 6 - Initial gas-oil ratio. (GOR)
- 7 - Estimated ultimate oil production
- 8 - Cumulative distillate production
- 9 - Cumulative gas production

<u>Index</u>	<u>Parameter</u>	<u>Sort variable</u>	<u>Sort category</u>
1	1	County	LE

<u>Index</u>	<u>Parameter</u>	<u>Sort Variable</u>	<u>Sort Category</u>
	2	County	ED
	3	County	CH
	4	County	RO
2	1	Year discovered	44
	2	Year discovered	49
	3	Year discovered	50
	4	Year discovered	51
	5	Year discovered	52
	6	Year discovered	53
	7	Year discovered	54
	8	Year discovered	55
	9	Year discovered	56
	10	Year discovered	57
	11	Year discovered	58
	12	Year discovered	59
	13	Year discovered	60
	14	Year discovered	61
3	1	Depth range	05-06
	2	Depth range	07-08
	3	Depth range	08-09
	4	Depth range	09-10
	5	Depth range	10-11
	6	Depth range	11-12
	7	Depth range	12-13
	8	Depth range	13-14
	9	Depth range	14-15
4	1	Age	WC
	2	"	VI
	3	"	MI
	4	"	DM
	5	"	DE
	6	"	MO
5	1	Status	PR
	2	Status	AB
	3	Status	SI
6	1	Province	S
	2	Province	B
	3	Province	H
	4	Province	P
7	1	Lithology	L
	2	Lithology	D
	3	Lithology	S
8	1	Trap type	SC
	2	Trap type	ST
	3	Trap type	CO
9	1	Drive	WA
	2	Drive	GC
	3	Drive	SG
	4	Drive	GE
10	1	Discovery method	SEG
	2	Discovery method	SUB

3	Discovery method	RAN
4	Discovery method	SUS
5	Discovery method	OWR

SPECIAL NOTES

1. This program is designed to sort on either alphameric or numeric variables or both. If the sorting variable is alphameric, the input parameters, labeled IPAR (), which are read into the program must be left hand justified in the nine column field of the input card. These input parameters must be in the IBM 1620 numeric representation for the alphameric name of each of the sorting categories, e.g., if the category is "AB" the input card is 414200000 in the 1st nine columns.
2. For numeric sorting, the input parameters are right hand justified in the nine column field.
3. The data input for this program is somewhat specialized, inasmuch as it was designed for a particular data input form (see Table 2). However, by modifying the read statement, 9, and the format statement, 10, the program may be made to accept any data format desired. The data format is left to the user's choice.
4. If any piece of data within a data set has a zero value, it is not counted or averaged. If the user desires to average in all zero values, then the statement; if (IDATA (K,I)), 18, 19, 18, must be removed from the source deck.
5. If the number of data points within a particular sorting category is zero then no output is punched for this particular category. This procedure is designed to prevent division by zero within the machine.
6. Once the data format has been determined, the parameter cards may be altered readily with only two restrictions. First, the maximum number of sorting variables cannot exceed the value given to INDCR. Second, within a particular sorting variable the maximum number of categories cannot exceed the value given to IS for the sorting variable.
If for a particular set of data the user does not wish to sort on a particular sorting variable that has been previously used, then all that must be done is to remove the parameter cards for that particular variable from the parameter deck. Likewise, a sorting category may be added or removed. But in removing or adding a sorting category, the value of IS must be altered accordingly.
7. If several groups of data with the same input format are to be operated upon consecutively,, then the last card in each parameter deck must give a value to IN such that IN > INDCR to return the program to its initial position.

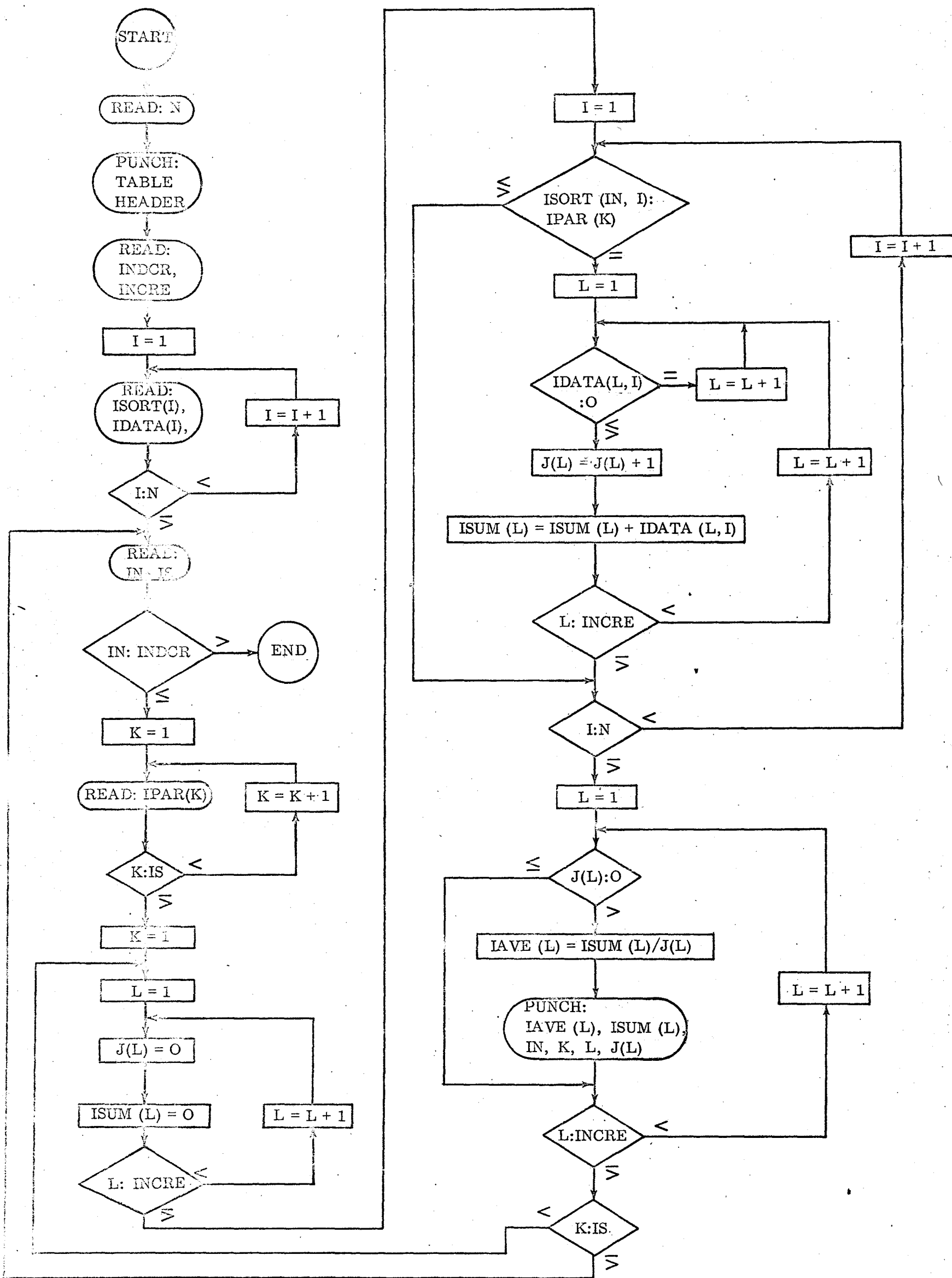


Figure 1.--Generalized flow diagram for sum, sort, and average program.