"NurseStaff"

Version 1.1

"A comprehensive nurse staffing analysis package"

Designed by:
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Preface

This manual is for the PACU software package which was written for Cindy Christensen, the Head Nurse of the Post Anesthesia Care Unit (PACU) in the University of Michigan Hospital. It will compute the time average, maximum and minimum number of patients in the PACU for two different modes of processing which are explained herein. The software is intended for use with an IBM PS/2 or a compatible machine. The program was made especially user friendly so that a person without prior computer experience would have no problem operating it. We have spent many hours perfecting the operation of the software and entering the past data. We hope that this software package and User's Manual is of some help to the nurses of the PACU. Good luck using it!

Andrew Paliszewski
Francis Striker

University of Michigan, College of Engineering
Ann Arbor, Michigan, April 1988
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How the Program Works

This program reads in data from past months and sums up patient hours in the Main recovery room of the PACU for a specified day of the week. Each patient that has passed thru the Main Recovery room is considered a record. Each of these records contain the following four attributes for the time the patient was in the Main: the day of the week the patient was in the Main, the week number of the month, the time the patient entered the Main (Time-In) and the time the patient left the Main (Time-Out). The program rounds the Time-In and Time-Out of each patient to the nearest half hour using the following rule:

More than 44 minutes after the hour - rounds up to next hour

Between 14 and 44 minutes after the hour - rounds to half hour

Less than 14 minutes after the hour - rounds down to the hour

The following examples are included to help explain how the rounding of time works:

If a patient entered the PACU at 10:12 a.m. and left at 1:48 p.m. the program would round these times to 10 a.m. and 2 p.m. (14:00) respectively.

If a patient entered the PACU at 3:25 p.m. and left at 5:39 p.m. the program would round these times to 3:30 (15:30) and 5:30 (17:30) respectively.

Because of this rounding rule there can be so many people in the PACU at a certain time. For example, if a patient leaves at 10:25 a.m. and another patient comes in at 10:35 a.m., both are counted as being in the PACU at 10:30 a.m.
After the data has been read in and the patient hours computed, the results are either listed in a file or sent to the screen (see pg. 8 for more details). Listed in the results are the average number of patients, the maximum number of patients, the minimum number of patients and the average Nursing Staff required. Each of these columns are listed for each half hour interval between 8 a.m. and 12:30 a.m. (the regular hours of the Main). The 24 hour clock was used for computational convenience.

"He's dead, all right—beaked in the back ... and you know this won't be easy to solve."
How to run the Program

How to start up the Program

1.) Place the "PROGRAM" disk into Drive "A" (Leftmost slot).

2.) Place the "DATA" disk into Drive "B" (Rightmost slot).

![Drive A Drive B](image)

Figure 1. Disk Drives

3.) Turn on the Computer and Monitor.

4.) Wait for the "A>" to appear, then hit the CAPS LOCK key on the Keyboard.

5.) Punch in the word "PACU" after the "A>" and hit return from here the following should appear:

This program was designed for Cindy Christensen, the Head Nurse of the Post-Anesthesia Care Unit (PACU) in the University of Michigan Hospital. It will compute the time average number of patients in the PACU for different modes of processing which will be determined by the user (see the users manual for a description of the modes).

(Hit return to continue)

If Figure 2. does not appear on the screen repeat step 5. If step 5 does not work turn off the computer and go back to step 1.
It is not necessary to use the remainder of this section of the User's Manual to operate the program. It is present for those who might wish to learn how to operate the program without the use of a computer.

6.) After RETURN is hit, the following will appear on the screen:

If you would like the results to be printed to a FILE, type in a 1
If you would like the results to be printed on the SCREEN, type in a 2
Remember to hit the RETURN key after your entry.

Figure 3.

If something besides a 1 or a 2 is entered, the program will automatically go back to figure 3 and ask the user to choose again.

REMEMBER TO HAVE THE CAPS LOCK BUTTON ON
- The program will not work if this button is not on.

7.) After a 1 or 2 and the RETURN is hit, the following will appear on the screen:

If you would like DAY-IN-MONTH processing, please type in a 1
If you would like DAY-IN-YEAR processing, please type in a 2
Remember to hit the RETURN key after your entry.

Figure 4.

The two types of processing are explained in the next section.
8.) Again, a 1 or 2 must be entered and the RETURN hit. If a 1 is entered, DAY-IN-MONTH processing is chosen and the following will appear on the screen:

You picked DAY-IN-MONTH processing. Please type in the abbreviated name of the month you would like to consider. Do not forget to hit the RETURN key after your entry.

January = JAN
February = FEB
March = MAR
April = APR
May = MAY
June = JUN
July = JUL
August = AUG
September = SEP
October = OCT
November = NOV
December = DEC

Figure 5.

After inputting the desired Month's abbreviated name and hitting RETURN, the following will appear on the screen:

Please type in the abbreviation corresponding to the day of week you would like to consider. Do not forget to hit the RETURN key after your entry.

Monday = MO
Tuesday = TU
Wednesday = WE
Thursday = TH
Friday = FR

Figure 6.

If a 2 is entered, DAY-IN-YEAR processing is chosen and the following will appear on the screen:
You picked DAY-IN-YEAR processing. Please type in the abbreviation corresponding to the day of the week you would like to consider. Do not forget to hit the RETURN key after your entry.

Monday = MO
Tuesday = TU
Wednesday = WE
Thursday = TH
Friday = FR

Figure 7.

Choosing the day of the week to be considered is the last decision the User will have to make, unless a wrong abbreviation has been entered along the line. If this is so, a self explanatory error message will appear on the screen and the program will ask the user for the correct input.
MODES OF PROCESSING

DAY-IN-MONTH

This mode of processing takes only one month of data into account when figuring statistics. The month is chosen by the user during the operation of the program. The day of the week (Monday thru Friday) which is to be considered is chosen in the same manner. For example, if you would like to acquire results for the Mondays in March, you would choose DAY-IN-MONTH processing by entering a 1 when Figure 4 appears. The month is chosen by entering the appropriate three letter month abbreviation. Don't forget the CAPS LOCK key! To choose the day, enter the two letter abbreviation for the appropriate day.

As stated above, this mode only takes into account the data from the day of the week specified in the one month which is chosen.

DAY-IN-YEAR

This mode is similar to the DAY-IN-MONTH mode except it uses data from the whole year. When the day of the week (Monday thru Friday) is chosen in the DAY-IN-YEAR mode, every day in every month is taken into account when computing the output statistics. For example, if DAY-IN-YEAR mode is chosen and Monday is chosen as the day of the week to be considered, every Monday in the whole year is taken into consideration during output calculations. This mode enables you to look at daily trends throughout the whole year, instead of just the daily trends for a given month, which the DAY-IN-MONTH mode gives.
WHERE THE RESULTS GO

This program enables you to choose where you want the output results to go. The two choices offered are the screen or a file by the name of OUTPUT.BAS. When the output is sent to the file a message appears telling the User where the output has gone. However, this file will only be useful until the program is operated again and more output sent to the file. In this case, the old OUTPUT.BAS file is erased and replaced by the new one. It is recommended that if you wish to keep the old file, you should recopy the file OUTPUT.BAS into a new file. A good way to remember what is in the particular copied output file is to name it by day and month. For example, a good name for the copied output file from the Mondays in June would be MON.JUN, or something of the sort.

HOW TO PRINT THE RESULTS

To print the results from a job, first send the results to the screen when asked by the program (see Figure 3.). After the program is run, and the first half of the day is displayed on the screen, go to your key board and hit the SHIFT and PRT SC (print screen) buttons simultaneously. This will cause what is displayed on the screen to be printed on the printer connected to the computer you are using.

NOTE: the computer which you are working on must have a printer connected to it for this to work. The power for the printer must also be ON and the printer must be in the ON LINE mode. If any problems arise with your printer, consult your printer manual.

To print out the second half of the day's results, just hit the RETURN key after you've printed up the first half of the day and repeat the SHIFT and PRT SC key sequence when the results for the second half of the day appear on the screen. Pretty simple, huh?

SEE THE APPENDIX FOR A SAMPLE OF THE FIRST AND SECOND HALVES OF A DAY'S OUTPUT.
Aside from running the program, you will constantly find the need to enter more data. Clearly this will provide the most up to date information regarding the staffing requirements. The task of data entry will be time consuming and very tedious to say the least. In light of this, it is strongly recommended that data entry be done on a weekly, or if possible, daily basis.

Set-Up of Data Records

Each patient who enters the PACU will be assigned a record in the data file which corresponds to the month in which he/she was in the hospital. For this program, a record is merely an amount of disk memory allocated to storing the data relevant to the patient which is used by the program. In turn, each of these patient records will have four attributes. The term attribute corresponds to a section of the record which contains a specific type of information. The four attributes which correspond to each record are:

1) day of the week  
2) number corresponding to the number of the week  
3) time the patient entered the PACU  
4) time the patient left the PACU

All four of these records must be entered for each patient. Omission of one or more will cause the program to malfunction. When entering data into the computer, each patient's data will be entered on a separate line. Thus, there will be four pieces of information on each line. For example, if a patient was in the PACU on Tuesday, April 12, 1988 from 10:25 a.m. until 1:55 p.m., the data line would appear as follows:
A carriage return is entered at the end of each line. The data records must be entered in this exact manner for the program to properly function. It is important to note several things with respect to the data files.

- the day of the week must be entered in capital letters
- the number 2 in this case, corresponds to the second Tuesday of the month, and not necessarily the second week in the month.
- the time of entry and time of departure must be entered in 24 hour (European) format.
- the colon in the time of entry and departure are represented by a decimal point. The digits to the right do, however, correspond to one minute apiece. Thus, 10:55 a.m. is entered as 10.55.
- Commas must be entered between the separate records, however, no comma may be placed at the end of a line.

Although the program only accounts for the hours between 8:30 a.m. and 12:30 a.m., the entry and departure time of a patient can be outside of this range. For example if a patient enters at 11:15 p.m. and departs at 2:30 a.m., then the times can be entered as 23.15, 26.3. A sample of a data file can be seen below:

```
TU,2,15.3,19.0
TU,2,17.35,20.0
TU,2,18.0,20.0
TU,2,19.45,21.2
TU,2,19.45,21.45
TU,2,21.4,23.15
TU,2,23.3,24.3
WE,3,9.05,10.0
WE,3,11.3,12.3
WE,3,9.05,9.35
WE,3,9.5,12.0
WE,3,10.1,12.0
WE,3,10.1,15.2
```

When the last record of a given file is entered, no carriage return should be made. Thus, do not push return at the end of the data file.
Using WordStar for Data Files

First, place the WordStar disk in drive A and the data disk in drive B. Turn on the computer. You will be told to enter the date and time. Following this, the computer will automatically enter the WordStar program. A menu will appear on the screen which will look like the one shown below:

Next type the letter "N" corresponding to nondocument mode. The computer will ask which document you wish to edit. The command which needs to be given is B:XXX where XXX corresponds to the abbreviation of the month which you wish to edit. The screen, at this point, will look like the display below.

Use this command to create and alter program source files and other non-documents. Word wrap defaults off; tabbing defaults to fixed (TAB chars in file; 8-col stops); page breaks not shown; hi bit flags not used in file.

For normal word processing uses, use the "D" command instead.

A file name is 1-8 letters/digits, a period, and an optional 0-3 character type. File name may be preceded by disk drive letter A-D and colon, otherwise current logged disk is used.

NAME OF FILE TO EDIT? B:FEB
If the data being entered is the first records of the given month, WordStar will show a line of dummy data which looks like the following:

```
EMPTY, 0, 4, 4
```

Prior to entering data for this month, this line of dummy data must be deleted from the document. This is done by positioning the cursor to the right of the last character of the line (which will be 0) and pressing the delete key until the entire line has been fully removed. Now one can begin to enter data. Remember to turn the CAPS LOCK key on. Also, remember to push return at the end of each line, but not at the end of the last line.

The arrow keys can be used to move the cursor around the document to look back at previous entries. In addition the delete key can be to remove unwanted characters from the screen. For example, if by accident, two commas were entered when only one was needed. One can be removed by using the arrow keys to place the cursor to the right of one of them and striking the delete key. Then the arrow keys can be use to replace the cursor to where it was prior to the detection of the error.

WordStar also provides a simple way to insert data into the text. This is done with the insert function. Suppose, for example that a data record looked like this:

```
TU, 2, 9.35, 1045
```

Clearly a decimal point is missing in the departure time. In order to correct this error, use the arrow keys to place the cursor on the 4. Strike the INSERT key. Notice that an "Insert On" message lights up in the upper right side of the screen. Next type the decimal point. You will notice that the 45 moves to the right one space and a decimal point is inserted in the number. Now, strike the INSERT key again and notice that the Insert On message disappears from the
screen. Once again, reposition the cursor so that it is in place where you left off. It's that easy.

If you are adding more data to a file which already has a number of real records in it, simply use the arrow keys to move the cursor to the end of the document, strike the RETURN key and carry on with data entry. The same methods can be used to edit this file.

At the end of the data entry session, you need to save your work. First, make sure that there are no blank lines at the end of the file. This can be done by placing the cursor at the end of the last attribute entered for the last record. Strike the delete key several times to remove any blank lines. Now, strike the CTRL key simultaneously with the "K" key. Next strike the "D" key. WordStar will now save your document on the disk in the B drive and return you to the main menu. Type an "X" to exit WordStar and return to the system.

**Hints on Entering Data**

Data entry is clearly the most boring, time consuming task in the analysis. Unfortunately, there is no easier way to do it. For this reason, we suggest the following "helpful hints."

- First and foremost, do not try to enter more than one or two weeks of data at a time. Our experience (which is very extensive) suggests that many more errors will be made in this manner. Nothing is worse than searching through 900 lines of data to find a misplaced comma. Do yourself a big, big favor and enter data on a daily, every other day or at least weekly basis.

- Train several people in data entry and try to have them responsible for the data entry each week. This will facilitate the learning curve associated with the word processor and also, as more data entry is done by a particular person, the better they get at it.
• Insist that the logs be kept as neat as possible and in 24 hour time format. This will greatly simplify the task of entering data. More than one error was caused by an error in the mental conversion from 12 hour to 24 hour time.

• It may be effective to assign the task of data entry to one of the more junior nurses who have fewer collateral duties and responsibilities. Also, we recommend some sort of incentive (i.e. extra coffee break etc.) since this clearly is a taxing, repetitious task.

• Ensure, on a managerial level, that the data entry is kept up to date. The only way for the information provided to be of any use, it must be kept current. Particularly, it may be wise to make sure that the data is updated prior to the development of the PACU nursing schedule every two weeks. This will enable you to punch up the current or last month and notice any new or significant trends.

• If the program won’t run, chances are very good the reason is that one of the data files contains an error. We suggest the program be run every time new data is entered so the area in which the error occurs will be limited to the set of data most recently entered. This is a very effective troubleshooting method.

• Finally, the most common error in data entry is two commas where only one is needed. The only way to find this occurrence is through visual inspection. It may be convenient to print out the data file and search for the error on paper. To do this, from the main WordStar menu, type P rather than N. When asked which file to print type B:XXX, where XXX corresponds to the current month abbreviation being entered. When prompted by the next question, type ESC. Also, make sure the printer is on and on-line prior to this invocation.
APPENDIX

USE FOR MOTT HOSPITAL RECOVERY ROOM

The PACU Software package is adaptable to any recovery room or similar situation. All that need be done is to enter the appropriate data in their monthly files as explained in Section - C of this manual.

Even if Mott's hours vary from those of the University Hospital's PACU, results will still be calculated between the hours of 8 a.m. and 12:30 a.m. ONLY. If the hours of operation vary from those mentioned, above results will still be calculated between the mentioned hours. It is possible however, to alter the program to handle earlier starting or ending hours. This possibility is explored in the next sub section.

POSSIBLE ALTERATIONS OF THE PROGRAM

NOTE: Any altering of the program should only be attempted by a person with extensive computer programming and logic knowledge.

The actual program is written in the BASICA language and is therefore fairly easy to understand. It can be found under the names PACU.BAS or HOSPITAL.BAS on the PACUBACKUP disk. the PACU.EXE and HOSPITAL.EXE files are self executable files compiled in TURBO BASIC and can therefore not be altered. If the program is altered it is highly recommended that it be renamed and also made into an executable (.EXE) program. John Gialanella of Management Information Systems (MIS) has the necessary software and knowledge to complete this task. It is advised that Mr. Gialanella be contacted if any alteration of the program is to be made.
PROBLEMS?

If any problems arise with the running or operation of this software package that are not covered in this manual, the person to contact is John Gialanella of MIS. He knows almost everything!

"OK, folks! ... It's a wrap!"
## SAMPLE OUTPUT

### FIRST HALF OF DAY

Time Average number of patients in the PACU on Monday for the whole year.

<table>
<thead>
<tr>
<th>Time of day</th>
<th>Average number of patients</th>
<th>Maximum number of patients</th>
<th>Minimum number of patients</th>
<th>Average Nursing Staff required</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.00</td>
<td>0.1</td>
<td>1</td>
<td>0</td>
<td>0.1</td>
</tr>
<tr>
<td>8.30</td>
<td>0.9</td>
<td>4</td>
<td>0</td>
<td>0.5</td>
</tr>
<tr>
<td>9.00</td>
<td>3.0</td>
<td>6</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>9.30</td>
<td>4.7</td>
<td>8</td>
<td>1</td>
<td>2.3</td>
</tr>
<tr>
<td>10.00</td>
<td>6.3</td>
<td>11</td>
<td>2</td>
<td>3.2</td>
</tr>
<tr>
<td>10.30</td>
<td>8.3</td>
<td>13</td>
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<tr>
<td>11.00</td>
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<td>10.1</td>
<td>16</td>
<td>6</td>
<td>5.0</td>
</tr>
</tbody>
</table>

### SECOND HALF OF DAY

<table>
<thead>
<tr>
<th>Time of day</th>
<th>Average number of patients</th>
<th>Maximum number of patients</th>
<th>Minimum number of patients</th>
<th>Average Nursing Staff required</th>
</tr>
</thead>
<tbody>
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<td>15.00</td>
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<td>4.8</td>
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<td>24.00</td>
<td>0.5</td>
<td>3</td>
<td>0</td>
<td>0.2</td>
</tr>
<tr>
<td>24.30</td>
<td>0.2</td>
<td>1</td>
<td>0</td>
<td>0.1</td>
</tr>
</tbody>
</table>
LISTING OF PROGRAM

1 DIM TOT(50,5,12), AVG(50), TOTAL(50), MIN(50), MAX(50), MAXWK(13)
13 FOR I=1 TO 5
14 PRINT
15 NEXT I
16 PRINT "This program was designed for Cindy Christensen, the Head Nurse"
20 PRINT "of the Post-Anesthesia Care Unit (PACU) in the University of"
21 PRINT "Michigan Hospital. It will compute the time average number of"
22 PRINT "patients in the PACU for different modes of processing which"
23 PRINT "will be determined by the user (see the users manual for a"
24 PRINT "description of the modes)."
26 PRINT
27 PRINT "(Hit return to continue)"
29 INPUT GUS
30 FOR I=1 TO 20
32 PRINT
34 NEXT I
36 PRINT "If you would like the results to be printed to a FILE, type in "
38 PRINT "FILE, type in a"
40 PRINT "If you would like the results to be printed on the SCREEN, type in a"
42 PRINT "SCREEN, type in a"
44 PRINT "Remember to hit the RETURN key after your entry."
46 INPUT WHERE
47 REM
48 IF WHERE=1 THEN 60
50 IF WHERE=2 THEN 60
52 PRINT "lets try again"
54 PRINT
56 GOTO 36
58 REM *****
60 FOR I=1 TO 20
62 PRINT
64 NEXT I
70 PRINT "If you would like DAY-IN-MONTH processing, please type in a 1"
72 PRINT "If you would like DAY-IN-YEAR processing, please type in a 2"
75 PRINT "Remember to hit the RETURN key after your entry."
80 PRINT
82 PRINT
84 PRINT
86 INPUT TYPE
88 FOR I=1 TO 20
90 PRINT
92 NEXT I
94 IF TYPE=1 THEN 200
96 IF TYPE=2 THEN 600
98 PRINT "You have to enter either 1 or 2. Lets try again"
100 GOTO 70
102 REM
104 FOR I=1 TO 20
106 PRINT
108 NEXT I
110 PRINT "You picked DAY-IN-MONTH processing. Please type in the"
114 PRINT "abbreviated name of the month you would like to consider."
118 PRINT "Do not forget to hit the RETURN key after your entry."
120 PRINT
122 PRINT "January = JAN"
124 PRINT "February = FEB"
126 PRINT "March = MAR"
128 PRINT "April = APR"
130 PRINT "May = MAY"
132 PRINT "June = JUN"
134 PRINT "July = JUL"
136 PRINT "August = AUG"
138 PRINT "September = SEP"
140 PRINT "October = OCT"
20 PRINT "November = NOV"
21 PRINT "December = DEC"
22 REM ************ WE MIGHT WANT TO CHECK TO SEE IF MONTH$ IS VALID***
23 FOR I = 1 TO 20
24 NEXT I
25 PRINT "Please type in the abbreviation corresponding to the day of "
26 PRINT "week you would like to consider. Do not forget to hit the "
27 PRINT "RETURN key after your entry."
28 PRINT
29 PRINT "Monday = MO"
30 PRINT "Tuesday = TU"
31 PRINT "Wednesday = WE"
32 PRINT "Thursday = TH"
33 PRINT "Friday = FR"
34 INPUT D$
35 IF D$ = "MO" THEN 390
36 IF D$ = "TU" THEN 390
37 IF D$ = "WE" THEN 390
38 IF D$ = "TH" THEN 390
39 IF D$ = "FR" THEN 390
40 PRINT "You have entered the wrong abbreviation. Let's try again"
41 GOTO 350
42 REM
43 REM ************ WE MIGHT WANT TO CHECK TO SEE IF D$ IS VALID *****
44 NMONTH = 1
45 PRINT
46 PRINT "The program is running now. If you hurry you might be able"
47 PRINT "to get a cup of coffee before it's done."
48 IF MONTH$ = "JAN" THEN 426 ELSE 428
49 OPEN "B:JAN" FOR INPUT AS 41
50 GOTO 469
51 IF MONTH$ = "FEB" THEN 429 ELSE 431
52 OPEN "B:FEB" FOR INPUT AS 41
53 GOTO 469
54 IF MONTH$ = "MAR" THEN 432 ELSE 434
55 OPEN "B:MAR" FOR INPUT AS 41
56 GOTO 469
57 IF MONTH$ = "APR" THEN 435 ELSE 437
58 OPEN "B:APR" FOR INPUT AS 41
59 GOTO 469
60 IF MONTH$ = "MAY" THEN 438 ELSE 440
61 OPEN "B:MAY" FOR INPUT AS 41
62 GOTO 469
63 IF MONTH$ = "JUN" THEN 441 ELSE 443
64 OPEN "B:JUN" FOR INPUT AS 41
65 GOTO 469
66 IF MONTH$ = "JUL" THEN 444 ELSE 449
67 OPEN "B:JUL" FOR INPUT AS 41
68 GOTO 469
69 IF MONTH$ = "AUG" THEN 450 ELSE 452
70 OPEN "B:AUG" FOR INPUT AS 41
71 GOTO 469
72 IF MONTH$ = "SEP" THEN 453 ELSE 455
73 OPEN "B:SEP" FOR INPUT AS 41
74 GOTO 469
75 IF MONTH$ = "OCT" THEN 456 ELSE 458
76 OPEN "B:OCT" FOR INPUT AS 41
77 GOTO 469
78 IF MONTH$ = "NOV" THEN 459 ELSE 461
79 OPEN "B:NOV" FOR INPUT AS 41
80 GOTO 469
81 IF MONTH$ = "DEC" THEN 462 ELSE 464

-19-
OPEN "B:DEC" FOR INPUT AS #1
GOTO 469
PRINT "***** You put in the wrong abbreviation for the month you "
PRINT "wanted to consider. Let's try again."
PRINT "(Hit return to continue)"
INPUT GUS
GOTO 180
IF EOF(1) THEN 1500
INPUT #1, DAYS, WEEK, TIN, TOUT
IF DAYS="EMPTY" THEN 462 ELSE 495
FOR I=1 TO 20
PRINT NEXT I
PRINT USING "No data exists for the month of ", let's try another month."
CLOSE 1
GOTO 200
REM *********
IF US=_DAYS THEN 500 ELSE 469
IF WEEK=NUMDAY THEN 520
NUMDAY=WEEK
REM ******
GO TO THE ROUND OFF SUB
GOSUB 1000
GOTO 469
REM
FOR I=1 TO 10
PRINT
PRINT "You picked DAY-IN-YEAR processing. Please type in the "
PRINT "abbreviation corresponding to the day of the week you would"
PRINT "like to consider. Do not forget to hit the RETURN key after"
PRINT "your entry."
PRINT
PRINT " Monday = MO"
PRINT " Tuesday = TU"
PRINT " Wednesday = WE"
PRINT " Thursday = TH"
PRINT " Friday = FR"
INPUT D$
PRINT
IF D$="MO" THEN 681
IF D$="TU" THEN 681
IF D$="WE" THEN 681
IF D$="TH" THEN 681
IF D$="FR" THEN 681
PRINT "You entered the wrong abbreviation. Let's try again"
GOTO 606
REM ****** SHOULD WE CHECK TO SEE IF D$ IS VALID
PRINT "The program is running now. If you hurry you might be able"
PRINT "to get a coffee and a doughnut before its done."
PRINT
OPEN "B:JAN" FOR INPUT AS #1
GOTO 765
OPEN "B:FEB" FOR INPUT AS #1
GOTO 765
OPEN "B:MAR" FOR INPUT AS #1
GOTO 765
OPEN "B:APR" FOR INPUT AS #1
GOTO 765
OPEN "B:MAY" FOR INPUT AS #1
GOTO 765
OPEN "B:JUN" FOR INPUT AS #1
GOTO 765
OPEN "B:JUL" FOR INPUT AS #1
GOTO 765
OPEN "B:AUG" FOR INPUT AS #1
GOTO 765
OPEN "B:SEP" FOR INPUT AS #1
GOTO 765
OPEN "B:OCT" FOR INPUT AS #1
GOTO 765
OPEN "B:NOV" FOR INPUT AS #1
GOTO 765
OPEN "B:DEC" FOR INPUT AS $1
REM **** NOW TO PROCESS MONTH BY MONTH
NMONTH=NMONTH+1
IF EOF(1) THEN 840
INPUT #1,DAYS,WEEK,TIN,TOUT
IF DAYS="EMPTY" THEN 840
IF D$=DAYS THEN 800 ELSE 770
IF WEEK<NUM THEN 820
NUM=0
IF NUM<MAXWK(NMONTH) THEN 820
MAXWK(NMONTH)=NUM
GOSUB 1000
GOTO 770
NUMDAY=NUMDAY+NUM
CLOSE 1
IF NMONTH=1 THEN 707
IF NMONTH=2 THEN 709
IF NMONTH=3 THEN 711
IF NMONTH=4 THEN 713
IF NMONTH=5 THEN 715
IF NMONTH=6 THEN 717
IF NMONTH=7 THEN 719
IF NMONTH=8 THEN 721
IF NMONTH=9 THEN 723
IF NMONTH=10 THEN 725
IF NMONTH=11 THEN 727
IF NMONTH=12 THEN 729
GOTO 1510
REM ********** SUB 1000 IS THE ROUNding AND SUMmING SUB
NIN=FIX(TIN)
MIN=TIN-NIN
IF MIN > .44 THEN 1100
IF MIN > .14 THEN 1150 ELSE 1200
MIN=MIN+.1
TIN=MIN
GOTO 1220
MIN=.5
TIN=NIN+MIN
GOTO 1220
TIN=MIN
TIN=FIX(TOUT)
MIN=TOUT-NIN
IF MIN > .44 THEN 1260
IF MIN > .14 THEN 1300 ELSE 1350
MIN=MIN+.1
TOUT=NIN
GOTO 1360
MIN=.5
TOUT=NIN+MIN
GOTO 1360
TOUT-NIN
REM ********** THIS LOOP SUMS UP THE TIME IN PACU
FOR I=TIN TO TOUT STEP .5
    J=2*I
    TOT(J, WEEK, NMONTH) = TOT(J, WEEK, NMONTH) + 1
NEXT I
RETURN

REM ************************************************************
REM REPORT PRINTOUT
REM
FOR I=8 TO 24.5 STEP .5
    J=2*I
    REM *** ASSIGN MIN AND MAX VALUES
    MAX(J)=0
    MIN(J)=100
    FOR L=1 TO NMONTH
        TOTAL(J)=TOTAL(J)*TOT(J, K, L)
        REM *** To process each week
        IF TOT(J, K, L)<MIN(J) THEN 1534 ELSE 1536
            MIN(J)=TOT(J, K, L)
            IF TOT(J, K, L)<MAX(J) THEN 1540
                MAX(J)=TOT(J, K, L)
        NEXT K
    NEXT I
    AVG(J)=TOTAL(J)/NUMDAY
    NEXT I

FOR I=1 TO 10
    PRINT
NEXT I

IF D$="MO" THEN 1610 ELSE 1620
    D$="Monday"
1620 IF D$="TU" THEN 1625 ELSE 1635
    D$="Tuesday"
1635 IF D$="WE" THEN 1640 ELSE 1645
    D$="Wednesday"
1645 IF D$="TH" THEN 1650 ELSE 1655
    D$="Thursday"
1655 IF D$="FR" THEN 1660 ELSE 1665
    D$="Friday"
1665 REM
1666 REM *** CHECK TO SEE WHERE OUTPUT IS GOING
1668 IF WHERE=1 THEN 1690
1669 IF WHERE=2 THEN 2000
1670 PRINT
1670 REM ***
1690 PRINT
1696 PRINT "The output has gone to the file named OUTPUT"
1700 OPEN "OUTPUT.BAS" FOR OUTPUT AS #2
1710 IF TYPE = 2 THEN 1740
1720 PRINT #2, USING "Time Average number of patients in the PACU on \ " : MONTH$ ;
1730 GOTO 1800
1740 PRINT #2, USING "Time Average number of patients in the PACU on \ " : ;
1750 PRINT #2, "for the whole year."
1760 PRINT #2,
1780 PRINT #2,
1800 PRINT #2,
1819 PRINT 2, "Time Average number of patients in the PACU on \ " : ;
1821 PRINT 2, "day patients \ " : ;
1825 PRINT #2,
FOR I=8 TO 24.5 STEP .5
-1860   J=2*I
1865   NSR=AVG(J)/2
1870   NIN=FIX(I)
1880   MIN=I-NIN
1890   IF MIN<.5 THEN 1920
1900   MIN=.30
1910   NIN=MIN+MIN
1920   PRINT #2,USING "###.###  ###  ###  #.####;NIN
1940   NEXT I
1950   REM
1960   REM
1970   REM
1975   GOTO 4999

2000   REM ***** THIS GOES TO THE SCREEN *****
2020   PRINT USING "Time average number of patients in the PACU on \"
2021   IF TYPE=2 THEN 2040
2025   PRINT USING "in the month of \";MONTH$
2030   GOTO 2100
2040   PRINT "for the whole year."
2100   PRINT
2120   PRINT "Time Average Maximum Minimum Average"
2140   PRINT "day number of number of number of Nursing Staff"
2160   PRINT "of patients patients patients required"
2180   FOR I=8 TO 24.5 STEP .5
2190   J=2*I
2195   NSR=AVG(J)/2
2200   NIN=FIX(I)
2210   IF MIN<.5 THEN 2250
2220   MIN=.3
2230   NIN=MIN+MIN
2235   IF I>14 THEN 2234 ELSE 2250
2240   IF I<15 THEN 2235 ELSE 2250
2250   PRINT USING "###.###  ###  ###  ###  #.####;NIN
2260   NEXT I
2280   REM
2290   REM
4999   END