

Fault Analyzer Mentor Workshop

Lab Exercises



Lab Exercise 1

Lab Setup: Create your lab files

In this exercise you will:

- Run the LABSETUP program to create your own copies of sample files that will be used during the File Manager exercises
 - Check that your files have been created
1. Log on to TSO (if you are not already logged on).
 2. Navigate to the ISPF command shell. On most systems, this is **Option 6** from the main ISPF menu.
 3. Run the LabSetup program:
 - On the command line, enter the lab setup command that your instructor or training coordinator has given to you. The command will have the format:

EX 'xxxx.ADLAB.INSTALL(LABSETUP)'

```
Menu List Mode Functions Utilities Help
-----
                                ISPF Command Shell
Enter TSO or Workstation commands below:
===> EXEC 'DNET249.MASTER.ADLAB.DATA(LABSETUP)'
```

```
Place cursor on choice and press enter to Retrieve command
=>
=>
->
```

4. You will see the message “**SETUP FOR HANDS-ON TRAINING**” message.
 - If you do not see this message, check the spelling of the command and try again.
 - Press the **ENTER** key repeatedly until the LabSetup program completes.
 - Note: Many screens full of messages will be displayed. Continue to press **Enter**. There may be times when three asterisks appear in the bottom left corner of the screen or the process just stops. Keep pressing Enter. You will end up at the Command Shell panel once again.

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Lab Exercise 2

Access the Fault Analyzer On-Line Library

In this exercise you will:

- Use a web browser to locate the Fault Analyzer manuals on the IBM web site.
 - Open the “Fault Analyzer User’s Guide and Reference” manual for your reference.
 - Learn how to download any of the File Manager manuals to your workstation.
1. Start an Internet Browser window.
 2. Open URL:
<http://www.ibm.com/software/awdtools/deployment>
 3. Click on the **Select a Product** pull-down.
 4. Click on **Fault Analyzer**

The screenshot shows the IBM website interface for z/OS Problem Determination Tools. The page has a dark blue header with the IBM logo and navigation links. Below the header is a search bar and a 'Country/region [select]' dropdown. The main content area is divided into several sections:

- z/OS Problem Determination Tools Library**: A vertical sidebar menu with links for News, How to buy, Training and certification, Services, and Support.
- Related software**: A list of software products including Application Performance Analyzer for z/OS, DebugTool for z/OS, Fault Analyzer for z/OS, File Export for /OS, File Manager for z/OS, and Workload Simulator for z/OS and OS/390.
- Related hardware**: A list of hardware products including zSeries servers and Warranty info.
- Products**: A section listing the **Application Performance Analyzer for z/OS** and the **Debug Tool for z/OS**.
- Solutions**: A section listing the **Problem Determination Tools Information Center** and the **IBM COBOL family**.
- Highlights**: A section with links for **File Manager: Latest PTF information**, **Fault Analyzer: Latest PTF information**, **Debug Tool: Latest PTF information**, and **WebSphere and zSeries AD tools help meet on demand**.

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5. Click on **Library**

Country/region [select] | Terms of use

Home | Products | Services & solutions | Support & downloads | My account

Software > Software Development > Fault Analyzer for z/OS

Library

Overview

- IBM Fault Analyzer for z/OS™ assists the developer in quickly identifying, analyzing and fixing application and system failures.
- Helps determine the cause of failure while further providing assistance in how to resolve the problem.
- Provides support for analyzing:
 - CICS® application and system abends
 - WebSphere® Application Server for z/OS system abends
 - MQSeries® application abends
 - IMS application abends

We're here to help

Easy ways to get the answers you need.

Call me

E-mail us

or call us at
877-426-3774
Priority code:
104CBW67

Discover

6. You can browse manuals online. For the “User’s Guide and Reference” manual, click on the link under the Book Manager column.

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Software > Software Development > Fault Analyzer for z/OS

Library

Fault Analyzer Version 7 Release 1 Publications - English

Title	Order number	PDF	Book Manager	Last Update
Program Directory	GI10-8744-00	0.1 MB		Sep 06
User's Guide and Reference	SC19-1088-01	5.6 MB	1.7 MB	Nov 06
Browse the Bookshelf online			1 KB	Nov 06
Download the Bookshelf for local PC use			1 KB	Nov 06

PDFs

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How to use Book Manager files on VM or z/OS

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- The contents page for the manual appears. You can use the navigation links to get to specific sections.
- Click on the browser's **BACK** button until you are back to the Fault Analyzer Library page.
- You can download Debug Tool manuals to your workstation from this web site.
RIGHT CLICK on the link for the “User’s Guide and Reference” under the PDF column.



- Click on **SAVE TARGET AS**.
- A dialog is displayed where you can select any valid directory on your workstation to download the manual in PDF format. If you would like a softcopy of the manual, you can download and save it now. Otherwise, press Escape.
- Close your Internet Browser window.



Lab Exercise 3

Review JCL to Compile a Sample Program

In this exercise you will:

- Examine JCL used to compile the sample programs.
- See that a compiler can generate a SYSDEBUG file and/or a Compiler Listing that Fault Analyzer can use to get program source information.

Tip: About compiling a program for use with Fault Analyzer.

- It is NOT NECESSARY to compile a program with any special settings if you want Fault Analyzer to perform abend analysis on it. Fault Analyzer can produce an Analysis Report on any program.
- HOWEVER, if program source information is available, the Fault Analyzer report will give you specific information about program statements and variables. Source information makes your abend investigation much, much easier.
- There are several ways to save “Source information” for Fault Analyzer. The most common formats are SYSDEBUG files and Compiler Listings. Both of these files are generated by the compiler.
- It is best to use SYSDEBUG files. However some compilers, especially older ones, cannot produce them.

1. Log on to TSO (if you are not already logged on).
2. Navigate to the ISPF Editor (usually option 2 from the main menu), and edit file:
your-id.ADLAB.JCL(BSAM1).

```
SPF/E EDIT DNET074.ADLAB.JCL(BSAM1) - 01.04          Columns 00001 00072
Command ==> |                                         Scroll ==> CSR
***** Top of Data *****
000001 /* - - - ADD A JOB CARD HERE - - -
000002 /******
000003 /* COBOL COMPILE
000004 /******
000005 //COBCOMP EXEC PGM=IGYCRCTL,
000006 //      PARM='TEST(NONE,SYM,SEPARATE),LIST,MAP,SOURCE,XREF,LIB,DYNAM,
000007 //      NORENT,NOOPT'
000008 //STEPLIB DD DISP=SHR,DSN=COBOL.V3R2.SIGYCOMP
000009 //SYSIN   DD DISP=SHR,DSN=YOUR-TSO-ID.ADLAB.SOURCE(SAM1)
000010 //SYSLIB  DD DISP=SHR,DSN=YOUR-TSO-ID.ADLAB.COPYLIB
000011 //      DD DISP=SHR,DSN=YOUR-TSO-ID.ADLAB.SOURCE
000012 //SYSPRINT DD DISP=SHR,DSN=YOUR-TSO-ID.ADLAB.LISTING(SAM1)
000013 //SYSDEBUG DD DISP=SHR,DSN=YOUR-TSO-ID.ADLAB.SYSDEBUG(SAM1)
000014 //SYSLIN  DD DISP=(MOD,PASS),DSN=&&LOADSET,UNIT=SYSALLDA,
000015 //      SPACE=(80,(10,10))
000016 //SYSUDUMP DD SYSOUT=*
000017 //SYSUT1 DD SPACE=(80,(10,10),,ROUND),UNIT=SYSALLDA
```

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3. Note: YOU DO NOT NEED TO CUSTOMIZE OR SUBMIT THIS JCL IN THIS EXERCISE. This is generic compile JCL that has not been customized for your system. However, the JCL that was used to compile the sample programs that you will use is very similar.
4. Notice the SYSDEBUG DD statement. This is a special file that is generated by the compiler that contains detailed Source information. Fault Analyzer can use it. The compiler produces it when:
 - The TEST compiler parameter with the SEPARATE sub-parameter is specified.
 - The SYSDEBUG DD statement is present, and it references a file with the correct attributes. It should be a PDSE (or PDS) member. The member name should be the same as the program name.
5. Notice the SYSPRINT DD statement. This is the compiler listing. Fault Analyzer can use it to get program source information. For Fault Analyzer to use it, it must be saved in a file.
 - The SYSPRINT file should be a PDSE (or PDS) member. The member name should be the same as the program name. File attributes must be correct for the compiler.
 - Certain compiler parameters must be specified to ensure that all the information that Fault Analyzer needs is present in the Listing. For this compiler (Enterprise COBOL), the required options are: LIST,MAP,SOURCE,XREF. Different compilers have different required options.

Tip: Which file should I save?

- Fault Analyzer can use either a SYSDEBUG file or a Compiler Listing. It is NOT necessary to save both of them.
- SYSDEBUG files are recommended. Fault Analyzer can *automatically* locate them. Also, they can be used by other IBM application development tools such as Debug Tool and Application Performance Analyzer.
- If you generate a SYSDEBUG file, only the TEST compiler parameter is needed. You can leave all other parameters unchanged.

6. Do not to submit the JCL. The sample programs were compiled prior to the workshop.
7. Exit from the editor.

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```
SDSF OUTPUT DISPLAY DNET074F JOB07674 DSID      2 LINE 0          COLUMNS 02- 81
COMMAND INPUT ==> █                                         SCROLL ==> PAGE
***** TOP OF DATA *****
                J E S 2   J O B   L O G   --   S Y S T E M   M V S A   --   N O D E

09.54.59 JOB07674 ---- FRIDAY,      14 APR 2006 ----
09.54.59 JOB07674 IRR010I USERID DNET074 IS ASSIGNED TO THIS JOB.
09.55.00 JOB07674 ICH70001I DNET074  LAST ACCESS AT 09:26:08 ON FRIDAY, APRIL 1
09.55.00 JOB07674 $HASP373 DNET074F STARTED - INIT 5    - CLASS A - SYS MVSA
09.55.00 JOB07674 IEF403I DNET074F - STARTED - TIME=09.55.00
09.55.01 JOB07674 +IDI0001I Fault Analyzer V6R1M0 (UK10217 2005/12/27) invoked
09.55.05 JOB07674 +IDI0002I Module SAM2, program SAM2, source line # 164: Abend
09.55.08 JOB07674 +IDI0003I Fault ID F00667 assigned in history file FAULTANL.V
09.55.08 JOB07674 IEF450I DNET074F RUNSAM1 - ABEND=S0C7 U0000 REASON=00000007
                971                                TIME=09.55.08
09.55.08 JOB07674 -                                --TIMINGS (MINS.)--
09.55.08 JOB07674 -JOBNAME  STEPNAME  PROCSTEP    RC    EXCP    CPU    SRB    CLOCK
09.55.08 JOB07674 -DNET074F          RUNSAM1  *S0C7    1655   .01    .00    .13
09.55.08 JOB07674 IEF404I DNET074F - ENDED - TIME=09.55.08
09.55.08 JOB07674 -DNET074F ENDED.  NAME-                                TOTAL CPU TIME=
09.55.08 JOB07674 $HASP395 DNET074F ENDED
----- JES2 JOB STATISTICS -----
                14 APR 2006 JOB EXECUTION DATE
                67 CARDS READ
```

7. Notice Fault Analyzer messages that begin with “IDI”. These were produced by Fault Analyzer.

- What is the name of the Fault History File where Fault Analyzer saved your Fault Entry?

- What is the Fault ID?

8. Next, in your SYSOUT viewer, browse the Fault Analyzer Real-Time Report. If your SYSOUT viewer displays DD names, look for DD name “IDIREPRT”:

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```
SDSF OUTPUT DISPLAY DNET074F JOB07674  DSID   109 LINE 0          COLUMNS 02- 81
COMMAND INPUT ===> █                                SCROLL ===> PAGE
*****
***** TOP OF DATA *****
*****
* IBM Fault Analyzer for z/OS V6R1M0 (UK10217 2005/12/27)          *
*                                                                 *
* (C) Copyright IBM Corp. 2000, 2005.  All rights reserved.      *
*****
JOBNAME: DNET074F  SYSTEM ABEND: 0C7                DEMOMVS   2006/04/14  09:55:01

<H1> I B M   F A U L T   A N A L Y Z E R   S Y N O P S I S

A system abend 0C7 occurred in module SAM2 program SAM2 at offset X'680'.

A program-interruption code 0007 (Data Exception) is associated with this abend
and indicates that:

    A decimal digit or sign was invalid.

The cause of the failure was program SAM2 in module SAM2.  The COBOL source code
that immediately preceded the failure was:
```

9. You can read the Real-Time Report from SYSOUT. In the next exercise, you will use the Fault Analyzer online interface to view the report. You will not need to see the SYSOUT again in these exercises, so you can exit from the SYSOUT viewer. Also, save the JCL in member your-id.ADLAB.JCL(XSAM) and exit from the ISPF editor.

Lab Exercise 5

Use the Online Interface to View a Real-Time Analysis Report

In this exercise you will:

- Use the Fault Analyzer Online Interface to find your Fault Entry
- Use the “V” line command to View a Real-Time report
- View the Real-Time report to see information about the abend

Part 1: Using the Online Interface

1. Log on to TSO (if you are not already logged on).
2. Navigate to the Fault Analyzer Online Interface. Ask your instructor for assistance, if you aren't sure how to get there on your system.

```
IBM Fault Analyzer - Fault Entry List                               Line 1 Col 1 80
Command ==> _____ Scroll ==> CSR
Fault History File or View : 'DEFAULT.FAULT.HISTORY.FILE'
{The following line commands are available: ? (Query), V (View real-time
report), I (Interactive reanalysis), B (Batch reanalysis), D (Delete), H
(Duplicate history).}

  Fault_ID Job/Tran User_ID Program Sys/Job Abend Date Time
  _____
  F00003 DNET074S DNET074 SAM2 DEMOMVS SOC7 2005/09/02 18:52:26
  F00002 DNET074S DNET074 SAM2 DEMOMVS SOC7 2005/09/02 18:40:24
  F00001 DNET074S DNET074 SAM2 DEMOMVS SOC7 2005/09/02 18:37:06

*** Bottom of data.
```

3. Check the name of the Fault History File shown. Verify that it is the history file where your Fault Analyzer stored your Fault Entry. Remember that Fault Analyzer displayed the history file name in the job log.
 - If the Fault History file shown is not the right one, type in the correct name, then press **ENTER**.
4. The correct Fault History file should be displayed. Next, find your fault entry. You can limit the display to only certain entries. Display only entries where the job name matches the first two characters of your job name:
 - Put your cursor on the first entry in the JOB/TRAN column.
 - Type in the first 2 characters of the job name, then asterisk, then space.

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- Press **ENTER**.

```

Tran User_ID Sys/Job
T074F dn* 074 DEMOMVS
02912 SYS029 DEMOMVS
0111 ADP0111 DEMOMVS
  
```

5. Notice that now only matching entries are displayed. You can match on any column, and you can even match on more than one column.

```

IBM Fault Analyzer - Fault Entry List                               Line 1 Col 1 80
Command ==>
Fault History File or View : 'FAULTANL.V6R1.HIST'

{The following line commands are available: ? (Query), V (View real-time
report), I (Interactive reanalysis), B (Batch reanalysis), D (Delete), H
(Duplicate history).}

  Fault_ID Job/Tran User_ID Sys/Job Abend Date Time
  ---
  F00667 DNET074F DNET074 DEMOMVS S0C7 2006/04/14 09:55:01
  F00626 CICSVTJ DNET356 DEMOMVS S013 2006/04/10 13:58:34
  F00625 DNET424G DNET424 DEMOMVS U4038 2006/04/10 07:16:38
  F00624 DNET3511 DNET351 DEMOMVS S0C4 2006/04/07 16:04:58
  F00623 DNET3511 DNET351 DEMOMVS S0C4 2006/04/07 15:36:04
  F00622 DNET3511 DNET351 DEMOMVS S0C4 2006/04/07 15:31:32
  F00621 DNET3511 DNET351 DEMOMVS S0C4 2006/04/07 15:27:27
  F00620 DNET3511 DNET351 DEMOMVS S806 2006/04/07 14:27:36
  F00619 GEN351 DNET351 6/04/07 10:30:36
  F00618 DNET924 DNET924 MATCH (User_ID) 6/04/07 03:16:43
  F1=Help F3=Exit F F6=Actions F7=Up
  F8=Down F10=Left F11=Right F12=MatchALL
  
```

Part 2: View a Real-Time Report

6. Use the “V” line command to view the Real-Time Analysis Report:

- Type **V** next to your Fault Entry, then **ENTER**.

```

IBM Fault Analyzer - Fault Entry List                               Line 1 Col 1 80
Command ==>
Fault History File or View : 'FAULTANL.V6R1.HIST'

{The following line commands are available: ? (Query), V (View real-time
report), I (Interactive reanalysis), B (Batch reanalysis), D (Delete), H
(Duplicate history).}

  Fault_ID Job/Tran User_ID Sys/Job Abend Date Time
  ---
  V F00667 DNET074F DNET074 DEMOMVS S0C7 2006/04/14 09:55:01
  F00626 CICSVTJ DNET356 DEMOMVS S013 2006/04/10 13:58:34
  F00625 DNET424G DNET424 DEMOMVS U4038 2006/04/10 07:16:38
  F00624 DNET3511 DNET351 DEMOMVS S0C4 2006/04/07 16:04:58
  
```

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7. The Real-Time Report is displayed. Notice that you can “Expand” and “Collapse” the report sections. Collapse all sections:

- Put your cursor on the **-** (minus sign) next to “Collapse All”, then **ENTER**.
- Notice that the report sections are all collapsed.

```
Real-Time Report
Command ==> _____
+ Expand all / - Collapse all
*****
* IBM Fault Analyzer for z/OS V6R1M0 (UK
*
* (C) Copyright IBM Corp. 2000, 2005. A
*****
JOBNAME: DNET074F  SYSTEM ABEND: 0C7
```

8. Expand all sections:

- Put your cursor on the **+** (plus sign) next to “Expand All”, then **ENTER**.
- Notice that the report sections are all expanded.

```
Real-Time Report
Command ==> _____
+ Expand all / - Collapse all
*****
* IBM Fault Analyzer for z/OS V6R1M0 (UK1
*
* (C) Copyright IBM Corp. 2000, 2005. Al
*****
JOBNAME: DNET074F  SYSTEM ABEND: 0C7
```

9. You can navigate the report using the Find command (for example: **F some-text**), and the scroll PF keys: PF7 (up), PF8 (down), PF10 (left), and PF11 (right).

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10. Navigate through the report to familiarize yourself with it. Find answers to the following questions. (Answers are on the following page).

- What program was executing when the abend occurred?

- What COBOL statement was executing?

- The program abended because there was bad data in a variable. What variable had the bad data?

- SAM2 is a sub-program. What is the name of the main program?

- There is a variable named CUST-NAME in program SAM2. What value was stored in this variable when the abend occurred?

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11. Answers to above questions:

- **What program was executing when the abend occurred?**
SAM2. This information is in the Synopsis section.
- **What COBOL statement was executing?**
COMPUTE CUST-ACCT-BALANCE = CUST-ACCT-BALANCE + WS-UPDATE-NUM. This information is in the Synopsis section.
- **The program abended because there was bad data in a variable. What variable had the bad data?**
CUST-ACCT-BALANCE. This variable is flagged as “Cause of error” in the Synopsis section. Also, the value is displayed in Hex in the Synopsis, which indicates that it has bad data.
- **SAM2 is a sub-program. What is the name of the main program?**
SAM1. This information is in the Event Summary section. The Event summary shows the active CALL chain. The first program in the list is the main program.
- **There is a variable named CUST-NAME in program SAM2. What value was stored in this variable when the abend occurred?**
“Aster, Dez”. This information is shown in the “Associated Storage Areas” section of the detail report for Event 3 (which is program SAM2). The easiest way to get this information is to do a Find command (for example: “F CUST-NAME”).

Lab Exercise 6

Using Interactive Re-Analysis

In this exercise you will:

- Become familiar with navigating when using Interactive Re-Analysis
1. Log on to TSO (if you are not already logged on).
 2. Navigate to the Fault Analyzer Online Interface. Ask your instructor for assistance, if you aren't sure how to get there on your system.

```
IBM Fault Analyzer - Fault Entry List                               Line 1 Col 1 80
Command ==> _____ Scroll ==> CSR_
Fault History File or View : 'DEFAULT.FAULT.HISTORY.FILE'
{The following line commands are available: ? (Query), V (View real-time
report), I (Interactive reanalysis), B (Batch reanalysis), D (Delete), H
(Duplicate history).}

  Fault_ID Job/Tran User_ID Program Sys/Job Abend Date Time
  _____
  F00003 DNET074S DNET074 SAM2 DEMOMVS S0C7 2005/09/02 18:52:26
  F00002 DNET074S DNET074 SAM2 DEMOMVS S0C7 2005/09/02 18:40:24
  F00001 DNET074S DNET074 SAM2 DEMOMVS S0C7 2005/09/02 18:37:06

*** Bottom of data.
```

3. Check the name of the Fault History File shown. Verify that it is the file where your Fault Analyzer stored your Fault Entry. Remember that Fault Analyzer listed the file name in the job log.
 - If the Fault History file shown is not the right one, type in the correct name, then press **ENTER**.
4. Use the “T” line command to view the Real-Time Analysis Report:
 - Type **I** next to your Fault Entry, then **ENTER**.

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```

IBM Fault Analyzer - Fault Entry List                               Line 1 Col 1 80
Command ==> _____ Scroll ==> CSR

Fault History File or View : 'FAULTANL.V6R1.HIST'

{The following line commands are available: ? (Query), V (View real-time
report), I (Interactive reanalysis), B (Batch reanalysis), D (Delete), H
(Duplicate history).}

  Fault_ID Job/Tran User_ID Sys/Job  Abend  Date      Time
  ---      -
I  F00667 DNET074F DNET074  DEMOMVS S0C7   2006/04/14 09:55:01
  F00626 CICSVTJ  DNET356  DEMOMVS S013   2006/04/10 13:58:34
  F00625 DNET424G  DNET424  DEMOMVS U4038  2006/04/10 07:16:38
  F00624 DNET3511  DNET351  DEMOMVS S0C4   2006/04/07 16:04:58
  F00623 DNET3511  DNET351  DEMOMVS S0C4   2006/04/07 15:36:04
  F00622 DNET3511  DNET351  DEMOMVS S0C4   2006/04/07 15:31:32
  F00621 DNET3511  DNET351  DEMOMVS S0C4   2006/04/07 15:27:27
  F00620 DNET3511  DNET351  DEMOMVS S806   2006/04/07 14:27:36
  F00619 GEN351  DNET351  DEMOMVS S0CB   2006/04/07 10:30:36
  F00618 DNET924  DNET924  DEMOMVS S0CB   2006/04/07 03:16:43
  
```

5. The Interactive Analysis Report panel is displayed:

```

File View Services Help
Interactive Reanalysis Report                                       Line 1 Col 1 80
Command ==> _____ Scroll ==> CSR
JOBNAME: DNET074F  SYSTEM ABEND: 0C7                               DEMOMVS  2006/04/14 09:55:01

Fault Summary:
Module SAM2, program SAM2, source line # 164 : Abend S0C7 (Data Exception).

Select one of the following options and press Enter to access further fault
information:
  1. Synopsis
  2. Event Summary
  3. System-Wide Information
  4. Abend Job Information
  5. Options in Effect

{Fault Analyzer maximum storage allocated: 1.56 megabytes.

*** Bottom of data.

F1=Help      F3=Exit      F4=Dsect     F5=RptFind   F6=Actions   F7=Up
F8=Down      F10=Left     F11=Right
  
```

6. Refer to the Workshop manual, and turn to the section titled: “Analyze an Abend”. Perform the step-by-step activities that are shown on those slides. As you go through the process, you will see information about the application that will lead to the reason why this particular abend occurred.