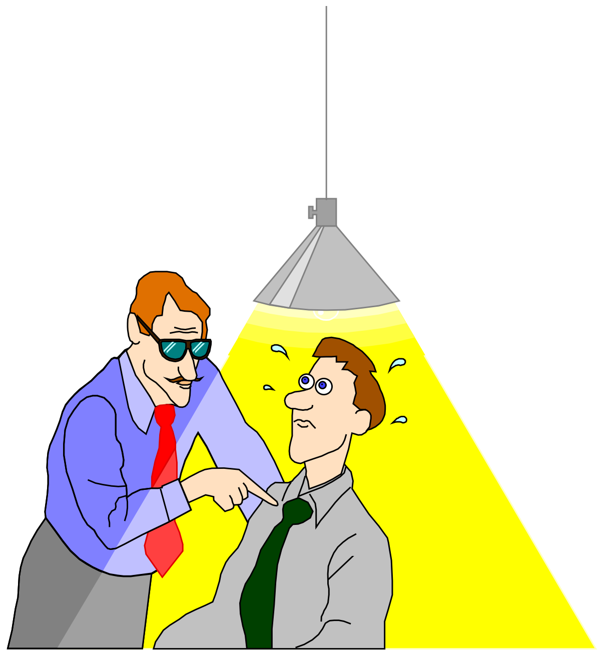
Inside Module 2

Working with Databases

Accessing data files

- These Suprtool commands access TurboIMAGE and Eloquence datasets:

BASE	GET
CHAIN	FORM
PUT	DELETE
UPDATE	



Opening and closing a database (Image)

- You can use the BASE command to open a database

```
>base store,5,READER
```

- The BASE command without parameters closes a database

- A database remains open until a BASE, RESET BASE or RESET ALL command is executed

- Eloquence Base command is slightly different; see module 3

How to find datasets in a database

- Use the FORM SETS command to display datasets

```
>base store.demo
Database password[;]?
>form sets
Database:STORE.DEMO.APPDEV TPI: SUPERDEX(15015d) 4.0.39

           Set      Item  Capa- Entry Load   Entry
Sets:      Num Type Count city  Count Factor Length B/F
M-CUSTOMER 1   M    9     211   12    9 %    55     7
M-PRODUCT  2   M    2     307   13    4 %    24     12
M-SUPPLIER 3   M    6     211   3     1 %    49     8
D-INVENTORY4   D    6     462   13    3 %    15     22
D-SALES    5   D    8     602   8     1 %    19     14
```

More about the Form command

- The FORM command without parameters first defaults to the current input dataset. If no input has been specified, then it defaults to FORM SETS.
- All output is written to the Formout file, which can be redirected to a line printer or a disc file. Currently the Formout file is not available on HP-UX.

Datasets as input sources

- The GET command reads a dataset in one of several ways
  - It can read the <u>entire</u> dataset serially
  - It can read a <u>subset</u> of dataset records serially
  - It can read records at a specified interval (e.g., every 5th record). This kind of sampling is useful for test purposes.
- A database must be open before you can use the GET command

Warnings using Get

- Suprtool checks the dataset entry count before and after processing, and warns you if it has changed.
- Suprtool permits concurrent changes, but warns you when this happens. If you need exclusive access, open the database in mode-4.
- If you repeatedly receive warnings of new entries, use the SET EOFREAD ON command to read to end-of-file. (Must be specified before the GET command!)

Determining fields in a dataset

- Use FORM *setname* to display the fields in a dataset

```
>form m-customer

M-CUSTOMER      MASTER    SET 1
  Entry:                   Offset
    CITY                  X12     1
    CREDIT-RATING         J2      13
    CUST-ACCOUNT          Z8      17  <<SearchField>>
    CUST-STATUS           X2      25
    NAME-FIRST            X10     27
    NAME-LAST             X16     37
    STATE-CODE            X2      53
    STREET-ADDRESS       2X25     55
    ZIP-CODE              X6      105

Capacity:211 (7)  Entries:20  Bytes:110
```

Defining New Fields

- Create new field definitions:

```
    > define D-STATUS,25,1,CHAR
```

- ABSOLUTE definition:

  define *field,byteposition,length*[,*type*]

  e.g. `> define ord-total,20,4,integer`

- RELATIVE definition:

  define *field,fieldname*[*(subscript)*][*[offset]*],*length*[,*type*]

  e.g. `> define branch-no,cust-code[1],2`

Relative defines are associated with a record item, so will stay correct if the field sequence changes.

Reading specific data chains

- If you know the key value(s), use the CHAIN command to search a dataset and select records with the specified key

```
>chain d-sales,customer = “123456”

>chain dtrans,partnum = “A123”,“B654”,“G999”

>chain d-sales,customer = slist    {use a table}
```

- Even when you know the key values, the GET command may select the same records faster than CHAIN can

```
>get d-sales; if $lookup(slist, customer)
```

Get versus Chain command

GET	**CHAIN**
Serial access	Keyed access
Any dataset	Only keyed datasets
All records	Only records with key values
Physical order	Forward chain pointers
MR NOBUF reads	DBFIND and DBGET mode-5 and -7
Selection by any data fields	Selection by key field

Exercise 1
Get versus Chain: quick, choose one!

- Your task is to retrieve records from the infamous ord-line detail dataset which contains 2.3 million records of 308 bytes each. The key values to be selected are in a file called Ordfile. These 162,000 ord-num field values will select 261,000 records from the dataset.

- Your mission, Jim, should you decide to accept it, will be to access the records as quickly as possible, using either the GET command or the CHAIN command. The final results must be sorted in ord-num sequence.

- As always, should you fail, the Secretary will disavow all knowledge of your actions.

Listing data from datasets

- Use the LIST command without parameters to list records whose format is known

```
>get m-customer
>list
>xeq

>GET M-CUSTOMER (1) >OUT $NULL (0)
CITY          = Edmonton  CREDIT-RATING  = 240000
CUST-ACCT     = 10005     CUST-STATUS    = 30
NAME-FIRST    = Terry     NAME-LAST      = Coyle
STATE-CODE    = AL
```

Changing Field Structure of Output

- By default ***all*** fields in the input record are copied to the output record.
- The EXTRACT command overrides this default.
  extract *field* [*(subscript)*][=*value*][,....]
  extract *field1\field2*
- Can have multiple EXTRACT commands
- Up to 255 extracted fields
- Can specify fieldnames, constants, strings
- Output record will be assembled with fields in the same sequence as the EXTRACT commands.

Extract example .....

```
>get m-customer
>extract name-first, name-last
>extract " City: "
>extract city
>output *
>xeq
Wayne     Humphreys        City: Vancouver
Elizabeth Welton           City: Coquitlam
William   Kirk             City: Richmond
Jack      Morrison         City: Calgary
James     Young            City: Edmonton
Percy     Ferguson         City: Coquitlam
Walley    Nisbet           City: Surrey
……..
```

A quick way to produce basic reports

- Use the LIST STANDARD command to produce a report with a predefined format

```
Feb 03, 1996  Base STORE.DEMO Set M-CUSTOMER   Page 1
CUST-ACCO  CITY         NAME-FIRST    NAME-LAST
10004      Edmonton     Arthur        Rogers
10005      Edmonton     Terry         Coyle
10015      Edmonton     James         Young
10016      Edmonton     Tara          Bamford
IN=4, OUT=4.  CPU-SEC=1.  WALL-SEC=1.
```

Suprtool lets you customize reports

You can modify reports to improve their appearance or functionality by doing the following:

- changing the report title
- changing heading names
- changing the sort key to make the report contents more meaningful

Customizing a report title and column headings

- It is easy to change your report title or column headings

```
>get m-customer
>if city = "Edmonton"
>sort name-last
>list standard,title "Customers in Edmonton",&
>> heading "Customer Name              ",&
>>      "City            ",&
>>      "Account"
>ext name-last,name-first,city,cust-account
>xeq
```

MPE/iX third-party indexing

- Requires Omnidex or Superdex indexing software or HP B-tree support (not currently supported in Suprtool/UX)

- CHAIN command can access third-party or IMAGE indexes

```
>chain m-customer,name-last = "A@"
```

- FORM command marks IMAGE fields with third-party indexing as "<<TPI>>", and B-trees as "<<Indexed>>"

- VERIFY BASE command displays name and version of indexing software

Form command shows third-party indexes

```
>form m-customer
M-CUSTOMER           Master     Set#1
  Entry:                  Offset
    CITY              X12     1   <<TPI>>
    CREDIT-RATING     J2     13
    CUST-ACCOUNT      Z8     17   <<SearchField>>
                                  <<TPI>>
    CUST-STATUS       X2     25
    NAME-FIRST        X10    27   <<TPI>>
    NAME-LAST         X16    37   <<TPI>>
    STATE-CODE        X2     53   <<TPI>>
    STREET-ADDRESS   2X25    55
    POSTAL-CODE       X6    105
Capacity: 211  Entries:20  Entry Length:55 Blocking:7
```

Exercise 2
Create a listing of the Alberta customers

- Create the following report from the STORE database:

```
Mar 20, 1996 20:32      Alberta Customers       Page 1

Account#  Name               City
   10004  Rogers             Edmonton
   10005  Coyle              Edmonton
   10006  Frahm              Calgary
   10007  Tiernan            Calgary
   10015  Young              Edmonton
   10016  Bamford            Edmonton
   10017  Morrison           Calgary
   10018  Johnston           Calgary
```

Changing data in datasets

- The Put, Delete and Update commands make changes to the contents of a dataset
- You must open the database in mode 1, 2, 3, or 4
- You can disable the Put, Delete, and Update functions via the Set Limits ReadOnly command

```
>set limits readonly on
```

Moving data into datasets

- We recommend this set of commands to perform a major load of a dataset from a file

```
>input loadfile
>set dumponerror on                {default}
>set defer on
>set ignore on
>put m-cust,store.pub,3
>xeq
```

- Input file record structure must match the destination dataset structure *exactly!*

What if the data doesn’t match exactly?

- Use EXTRACT commands to construct the output record

- Use DEFINE and EXTRACT to change storage formats:

```
> define amount,1,8,display {...in input file}
> define new-amount,1,4,integer {new field}
> extract new-amount = amount
```

- Field will have attributes as defined, and value from input record, so the output record will contain the 4-byte integer value of the 8-byte display field in the input record.

Deleting selected records from the input dataset

- Open the database in mode-1, -3, or -4
- Access the dataset using GET or CHAIN
- Select records to be deleted with IF command
- Delete the selected records using DELETE
- Optional step: copy the deleted records somewhere else (e.g., OUTPUT file, LIST file, PUT to another dataset)

```
>get d-sales
>item purch-date,date,yymmdd
>if purch-date < $date(*-
1/*/*)
>delete
>output oldsales.data,append
>xeq
```

Using two passes guarantees safety

```
>get d-sales
>item purch-date,date,yymmdd
>if purch-date < $date(*-1/*/*)
>output oldsales.data,append
>xeq

>get d-sales
>if purch-date < $date(*-1/*/*)
>delete
>output $null
>xeq
```

Update selected records with new values

- Open the database in mode-1, -2, -3, or -4
- Access the dataset using GET or CHAIN
- Select records to be updated using IF

```
>get d-sales
>item purch-date,date,yymmdd
>if purch-date < $date(*-1/*/*)
>update
>extract purch-status = “OLD”
>xeq
```

- Enable updating using UPDATE command; use CIUPDATE parameter to update critical fields
- Specify fields and new values using EXTRACT commands

Assigning Calculated Values

```
>get d-sales
>update
>extract sales-total = &
        (product-price * sales-qty) + sales-tax
>xeq
Update all records from the D-SALES dataset [no]: yes
Warning:  Using DBGET for the input records
IN=8, OUT=8. CPU-Sec=1. Wall-Sec=1.
```

Set Lock to control concurrent dataset access

- SET LOCK 1
  - Lock the dataset and unlock it again around every DELETE, PUT, and UPDATE
  - Least contention with other processes, but slowest option for Suprtool
- SET LOCK 0
  - Lock the dataset at the beginning of the task and unlock it only at the end
  - Best performance for Suprtool, but locks out other processes for duration of Suprtool run
- SET LOCK *n*
  - Lock dataset on *n* DELETE, PUT, or UPDATE transactions, then unlock
  - Compromise between SET LOCK 0 and SET LOCK 1

Summary

- Display datasets
- Field names and formats
- Data chains
- List datasets
- Reports (e.g., standard, customized)
- Third-party indexing
- Adding, deleting, and modifying records
- Changing data formats
- Locking options