IMS DB ONLINE TRAINING – DAY 3

Working with IMS Database

Following should be ready before executing any Application Program using IMS DB

For Batch

- DBD (Database Description Block - Database Structure)
- PSB (Program Specification Block - How Database is going to be accessed by program)

For Online

- ACB (Alternate Control Block – (Combines DBD and PSB))

*Once above is ready, we can compile and link edit the Application Program using IMS system program **DFSRRC00***

Process that creates these IMS Blocks

DBDGEN - Define the Database Structure

PSBGEN - Define the Program specification

ACBGEN - Define the Database and Program specification for Online

DBDLIB - Contains the load module of DB

PSBLIB - Contains the load module of PSB

ACBLIB - Contains the load module of ACB

Note:

- DBA maintains these control Blocks
- Application programmer should know how to use

IMS Control Blocks

DBD

- Hierarchical structure of DB
- Storage and Access Methods
- Segments and its length
- Primary key and Search key
- Field Attributes

PSB

- Contains one or more PCBs (Program Communication Block)
- Databases accessed and the level of access
- Segments and Fields to be accessed

IMS Control Blocks

PCB

- Application program view of DB (Logical structure)
- Contains segment and field level sensitivity

ACB

- Combines info of DBD and PSB

IMS Control Blocks

ACB

When IMS executes an Application Program, it uses ACB. ACB is a runtime control block which is a combination of both DBD and PSB.

For Batch programs, IMS dynamically creates an ACB.

For Online programs, it is created beforehand thru a process called ACBGEN that merges both DBD and PSB before execution.

IMS CONTROL BLOCKS - DBD

- DBD describes the physical structure (Hierarchical structure) of the database.

- It includes the DB name, segment names, key fields and search fields with length and starting position.

- In addition, it contains the Access methods and defines how many VSAM datasets are required to store the IMS DB.

- DBDs are assembled through a process called DBDGEN (DBD Generator) and reside in DBDLIB. It's a one time process.

- DBDGEN control statements are Assembler language Macros supplied by IBM and submitted via JCL and produces a load module that are stored in DBDLIB Library.

IMS CONTROL BLOCKS – DBD SAMPLE

```
DBD       NAME=DPSPAYRP,ACCESS=(HISAM,VSAM)
DATASET   DD1=FPSPAYRP,OVFLW=FPSPAYRO
SEGM      NAME=PSEMPLYR,PARENT=0,BYTES=50
FIELD     NAME =(EMPLYCOD,SEQ),BYTES=9,                    X
          START=1,TYPE=C
SEGM      NAME=PSPAYCKR,PARENT=PSEMPLYR,BYTES=50
FIELD     NAME=(PAYDATE,SEQ),BYTES=6,                      X
          START=1,TYPE=C
FIELD     NAME=PAYAMT,BYTES=4,START=7,TYPE=P
DBDGEN
END
```

IMS CONTROL BLOCKS – DBD Macros

DBD: Name of the Database

DATASET: Specifies the DDName used in Program Run Jcl pointing the DB datasets (KSDS/ESDS)

SEGM: Names the Segment. Identifies the parent and establishes the length.

FIELD: Defines field types and identifies Primary Key and Search fields

DBDGEN: Indicates the end of DBDGEN process

END: Specifies the end of the Assembler program

Exercise 3.1 - DBD

```
DBD      NAME=CT7DPPER,ACCESS=(HISAM)
DATASET         DD1=CT7DPISP,DD2=CT7DP2SP,
SEGM     NAME=RSCOMMNR,BYTES=80,PARENT=0
FIELD    NAME=(SOCSECNM,SEQ,U),BYTES=009,START=001,TYPE=C
FIELD    NAME=LASTNAME,BYTES=015,START=010,TYPE =C
SEGM     NAME= RSPAYRLR, BYTES=020,PARENT =RSCOMMNR
FIELD     NAME=(PAYDATE,SEQ,U),BYTES=006,START=001,TYPE=C
SEGM     NAME=RSPRSNLR, BYTES=025,PARENT=RSCOMMNR
FIELD    NAME=(JOBCODE,SEQ,U),BYTES=005,START=001,TYPE=C
SEGM     NAME=RSMEDICR,BYTES=090,PARENT=RSCOMMNR
FIELD    NAME=(VISITDTE,SEQ,M),BYTES=006,START=001,TYPE=C
DBDGEN
FINISH
END
```

- **What is the name of the DBD?**
- **What is the DDNAME of the primary dataset?**
- **What is the name of the Primary key field for DB?**
- **How many search fields are defined in the DBD?**
- **Draw the hierarchical structure of this database.**

IMS CONTROL BLOCKS - PSB

- The program specification block (PSB) defines which IMS data bases the application program can access,
- the program's logical view of the data base structure, and
- the type of access available to each data base segment (such as the Ability to ADD, CHANGE and DELETE).
- ALL IMS application programs must have a PSB.
- The program communication block (PCB) is a part of the PSB that specifies the DBD to be used by the program.
- The program communication block (PCB) is a part of the PSB that specifies the DBD to be used by the program.
- The application program will access at least one PCB for every database.

IMS CONTROL BLOCKS – PSB SAMPLE

```
PCB         TYPE=DB,NAME=DPSPERSP                          PCB1
SENSEG      NAME=PSEMPLRR,PARENT=0,PROCOPT=G
SENSEG      NAME=PSDEPMTR,PARENT=PSEMPLRR,PROCOPT=GI
PCB         TYPE=DB,NAME=DPSPAYRP                          PCB2
SENSEG      NAME=PSEMPLYR,PARENT=0,PROCOPT=G
SENSEG      NAME=PSPAYCKR,PARENT=PSEMPLYR,PROCOPT=K
PCB         TYPE=DB,NAME=DPSBENFP                          PCB3
SENSEG      NAME=PSEMPLBR,PARENT=0,PROCOPT=A
PSBGEN      LANG=COBOL,PSBNAME=PSPROG1B
END
```

IMS CONTROL BLOCKS – PSB MACROS

PCB - Program Communication Block pointing to a IMS Database that the program is going to access

TYPE - DB (Database – Used for Pure Batch Processing - DLI)

- TP (Teleprocessing – Used for Online Processing – BMP/MPP)

NAME - Name of the Database

SENSEG - Sensitive Segment - Contains Segment name that the Application program is authorized to access

PROCOPT – Processing Options – Denotes the level of Access to that particular segment thru the Application program

SENFLD - Mentions the fields that program has access to

PSBGEN - Denotes the End of PSB processing

LANG - COBOL/ASSEMBLER/PLI

PSBNAME – Name of the PSB

END - Denotes the End of PSB Macro

Note: In Project, there will be one dedicated PSB for every program. And the name of PSB and program name will be same.

IMS CONTROL BLOCKS - PSB PROCOPT

- G - GET (READ)
- D – DELETE
- I - INSERT
- R - REPLACE
- A - All options (G,I,R,D)
- L - LOAD (Used for Initial loading of data to an Empty Database)
- K - access to only the KEY of the segment
- O - ONLY: Used along with G as GO meaning Get Only (It's an Uncommitted or dirty Read)
- P - PATH calls

Exercise 3.2 - PSB

Below is a PSB control block. Answer the following questions about it.

```
PRINT    NOGEN
PCB      TYPE=DB,DBDNAME=VENDOR,KEYLEN=15
SENSEG   NAME=VENSEG,PROCOPT=G
SENSEG   NAME=ITEMSEG,PARENT=VENSEG,PROCOPT=R
SENSEG   NAME=LOCNSEG,PARENT=ITEMSEG,PROCOPT=A
PSBGEN
END
```

1. **LIST THE SEGMENTS THAT MAY BE UPDATED USING THIS PSB**
2. **LIST THE SEGMENTS THAT CANNOT BE UPDATED**
3. **GIVE THE VALID PROCOPT TO BE CODED FOR ADDING AND REPLACING RECORDS IN LOCATION SEGMENT**
4. **DRAW THE LOGICAL STRUCTURE OF THE DATABASE?**

End of Day 3