

Chapter  
2

**COMPONENTS**

*Get on the  
Fast Track!*



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COMPUTER  
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**Objectives**

You will learn:

- C Terminology.
- C MSL: Member Specification Library.
- C CSP/AD: facilities.
- C Map and application.
- C Test and generation.
- C CSP/AE: application execution.
- C Programming sequence.
- C Screen definition.
- C Field attribute definition.
- C Edit checking order.
- C Application definition.

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## 1 Terminology

Data Item:

A data item is a single unit of information.

Record:

A record is a collection of data items with a data structure organized for a particular purpose.

Working Storage:

Working storage is a special type of record that defines an application program. This record provides temporary storage space for an application program to perform calculations and store data which is to be passed to another application program.

Table:

A table is a collection of related data that is used for:

- C Editing data that is entered on a map by a user of the application program.
- C Storing information for reference by the application program during execution.

Map:

A map is the definition of the formatted display. During execution of the application the display can be seen on a terminal or printout.

**Map Group:**

A map group contains all the maps to be used in an application program. Maps in a map group can be defined and used in other application programs.

**Process:**

A process is an ordered series of instructions to CSP/AD, written in CSP/AD language, specifying what task the computer should perform.

These instructions, or processing statements are divided into two types:

**C Process Statements**

Processes that do not perform input or output. These processing statements use the EXECUTE option.

**C Processing Options**

Processes that perform input or output. These use the options that find data, update, write and delete records, and display maps.

**Statement Group:**

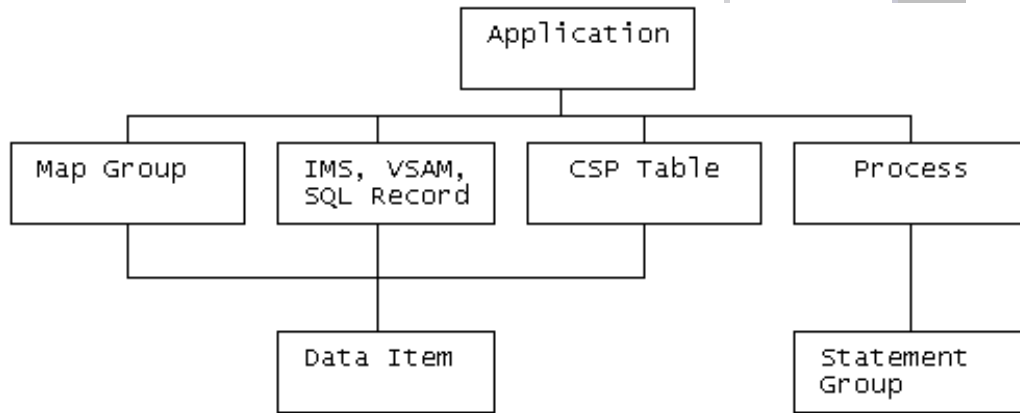
A statement group contains processing statements that only perform processing. A statement group cannot perform I/O processing options.

**Application:**

An application is the specification of the order in which the processes are to be executed. An application is a set of related definitions and instructions that CSP/AD generates into executable form.

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## 2 MSL: Member Specification Library



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### 3 MSL Structure

Member:

Each definition in the MSL is called a member. Members are related to an application. Each member must have a unique name.

- C MSL contain members which define the application components.
- C MSLs may be shared among several developers.
- C Typically each programmer has their own MSL.
- C MSL is a VSAM KSDS defined with the standard IDCAMS.
- C The MSL is the primary library for CSP/AD. It is the source library containing all definitions and provides facilities for viewing, editing, printing, and managing MSL members. This serves to make it dictionary-like in nature.
- C An MSL is a special data set that contains application definitions. The CSP/AD system can contain as many MSL definitions as necessary.

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## 4 CSP/AD: Facilities

List Processor:

The list processor allows all members in one or more MSLs to be listed or to selectively list a subset of members in one or more MSLs and then perform multiple utility functions.

The list processor utility functions provides the following capabilities:

- C List members in the MSL.
- C Select members for display.
- C Change members.
- C Delete members.
- C Print members.
- C Export members.
- C Copy members.
- C Rename members.
- C List the associates.

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## 5 Definition

The definition facility can be used for defining:

- C Records.
- C Tables.
- C Data Items.
- C Map Groups and Maps.
- C Applications.
- C Processes.
- C Statement Groups.
- C Program Specification Blocks - PSB.

In addition, it allows the user to enter a prologue. The prologue is a description of the data structure that is printed in the application listing. The prologue documents the use of the data structure.

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## 6 Map and Application

### Map Definition:

The map definition facility provides for the definition of a map or display of information for an output device. Through the map definition facility, a map group is set up. Maps are drawn and output devices are selected (e.g. terminals and printers). Each map is given a unique name and the map is contained in a map group.

All maps used in an application must be in the same map group except for user help maps, which can be in a separate map group. A different map group should be used for each application except when a map is passed as a parameter on a call statement to another application.

The screens are "painted on" and a hard-copy of the screen can be printed.

Field attributes and field names are assigned.

### Application Definition:

Through the definition facility, it is possible to define:

- C Application programs.
- C Processes.
- C Statement groups.

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## 7 Test and Generation

### Test:

The test facility provides for the checking of syntax on member names and statements in the process and statement groups.

If no serious errors are found, the application can be run with various trace options to find errors that can prevent proper execution of a program.

Trace and debugging facilities are available.

### Generation:

After the application has been successfully tested, the generation facility is used to convert the program into executable code for the desired systems environment.

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## **8 Tutorial**

The tutorial provides information on CSP and its facilities.

- C It can be used as a tutorial to learn CSP/AD or as an on-line reference source.
- C It is context sensitive providing you with assistance regarding the screen you are on.
- C It describes various error situations you may encounter.

Utilities:

CSP/AD utilities provide functions for file maintenance and managing MSL members.

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**9 CSP/AE: Application Execution**

ALF:

The Application Load File contains generated CSP applications for production executions, as well as source definitions being moved within CSP's. The ALF is the primary file for CSP/AE.

ALF Utility:

This utility is a supplied application for managing ALF.

Environment Interface Module:

The interface module, which is part of CSP/AE, communicates between CSP/AE and CSP/AD and each operating environment.

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## **10 Member in MSL**

Members typically relate to an application; in CSP they stand alone as entities within the MSL. This makes them reusable in other applications.

Member names must be unique and are restricted:

- C Map Group
  
- C Application, CSP Table, Process, Statement Group
  
- C Map, PSB, Record, Data Item

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## 11 Programming Sequence

### Data Definition:

Data that is used by an application for execution is defined as a data item. Each data item name is unique within an MSL. After a data item has been defined, it can be used in records, tables, and in maps by using the same data item name. A data item's characteristics do not need to be redefined each time the data item name is used, since it already exists in an MSL. It is good practice to begin defining an application with data definition.

If data items are not defined, but are used in an application, CSP/AD provides default definitions based on the use of each item. However, it is best to define all data items to keep their definitions consistent across applications and allow them to be passed as arguments to called applications.

### Records:

A record or multiple records can be contained in a file or data base as temporary working storage during application execution. A record is defined to CSP/AD with a record specification and a list of data items.

Fields:

The following data fields can be entered for each item on the SQL Row Data Item Definition Display.

Name	The data item name for the item as it is known in the program.
Type	The CSP/AD data item type.
Length	The number of decimal positions to the right of the implied decimal point in numeric items.
Bytes	The number of bytes reserved to contain the item.
Read-Only	This field indicates whether the item can be written to the data base. The setting of read-only determines what columns are included in generated SQL statements that write to the data base (DB2, SQL, IMS).

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## 12 Screen Definition

The definition facility provides the capability for defining a map or display of information for a terminal or printer device.

### Maps:

All information on a map is either constant or variable. Constant information is not changed during execution.

- C If a name is used that matches an existing data item which has never had its map editing characteristics set, map definition will update the data item with the map editing characteristics from the current map.

### Fields:

Variable information or fields on a map are named and editing characteristics can be defined for each variable field. CSP/AD supplies default field attributes for constant and variable fields.

- C If a variable field name is used for the first time during map definition, a data item definition is created when the map is filed.
- C If there are no errors with the field, the definition is used whenever the data item name is used again within another map, record, or table.

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## 13 Field Attribute Definition

Hardware or device attributes can be specified in order to be associated with each field on a map.

Field attributes should only be defined if the terminal device which is used to display a map supports the particular attributes. Field attributes have no effect on printers.

Editing criteria:

Map field edits are only supported when maps are processed. The following edit checks are done when either data is entered by a user to a map (input), or data is displayed to the user (output).

Output editing:

- C Justify
- C Fill
- C Decimal positions
- C Numeric separators
- C Currency symbol
- C Sign
- C Date edit formatting
- C Zero edit

Input editing:

- C Justify (character data only).
- C Input required.
- C Removal of decimal point.
- C Removal of numeric separators.
- C Removal of currency symbols.
- C Sign
- C Decimal alignment.
- C Date edit formatting.
- C Hexadecimal

On input editing, all symbols are removed, and numeric fields are right justified and zero filled in their internal storage areas. This is done before the remaining edit checks.

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**14 Edit Checking Order**

The following edit checks are made, in the following order for all entered fields, or fields with their MDT set on:

- C Numeric data type.
- C Minimum input.
- C Range check.
- C Modulus checks - EZEC10 to EZEC11.
- C Edit Table - range, valid or invalid.

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## 15 Application Definition

An application, process or statement group can be defined.

Interactive dialog supports top-down and bottom-up development.

Processes:

A process is built around a specific function known as a process option. The process option executes a single I/O function. A map or record that is used as the I/O object is named in the process definition. Only one process object is used per process.

Logic Statements:

A statement group is a block of processing statements that do not perform an I/O operation.

A statement group can be invoked in-line or as:

- C A map item edit routine or an error routine on a record I/O process, where execution is to continue with the statements following the process option after the error routine is complete.
- C Targets of TEST or FIND statements within processes or statement groups.
- C Subroutine statement groups can be used as subroutines.