Chapter
2

OVERVIEW

**SYS-ED/
COMPUTER
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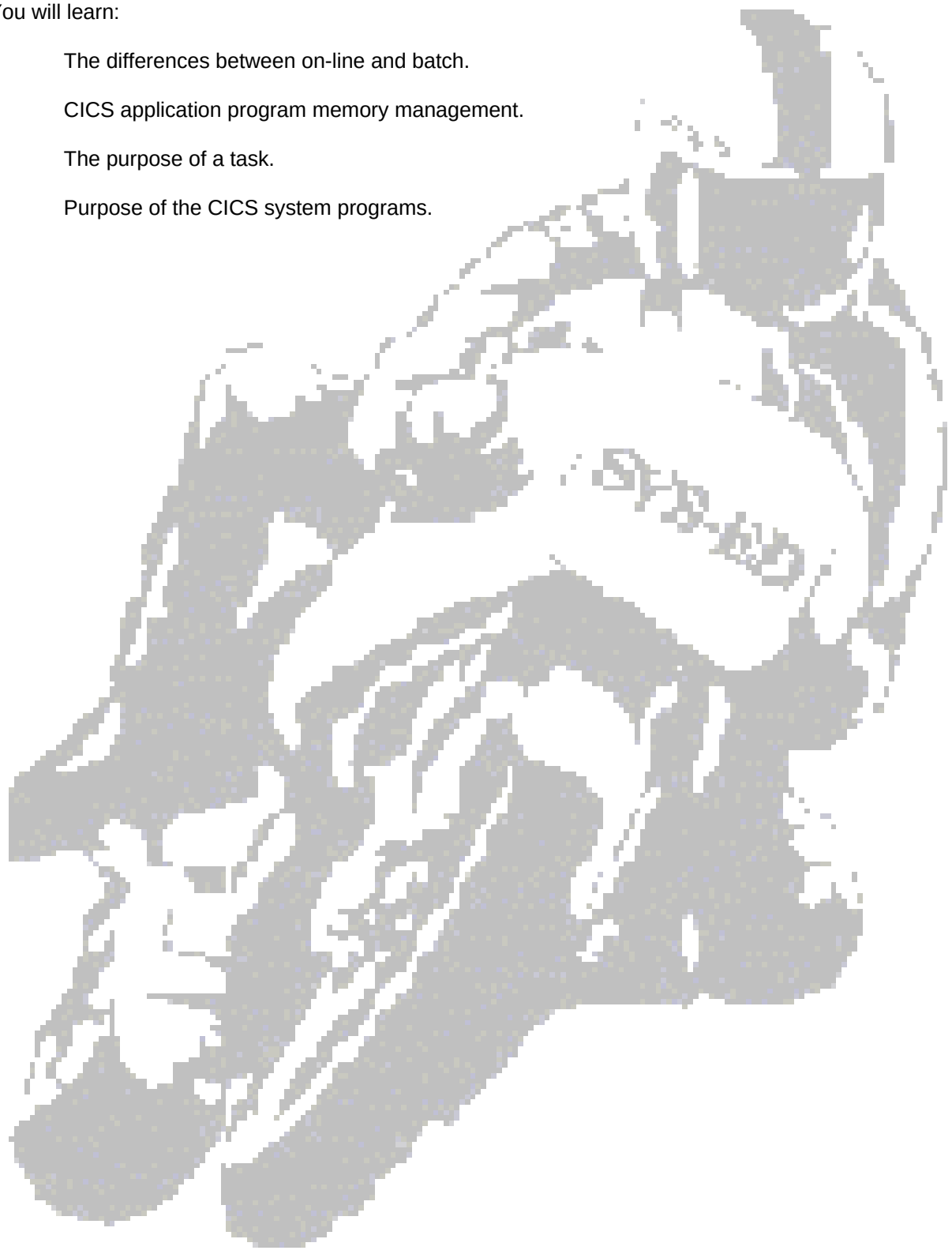
Objectives:

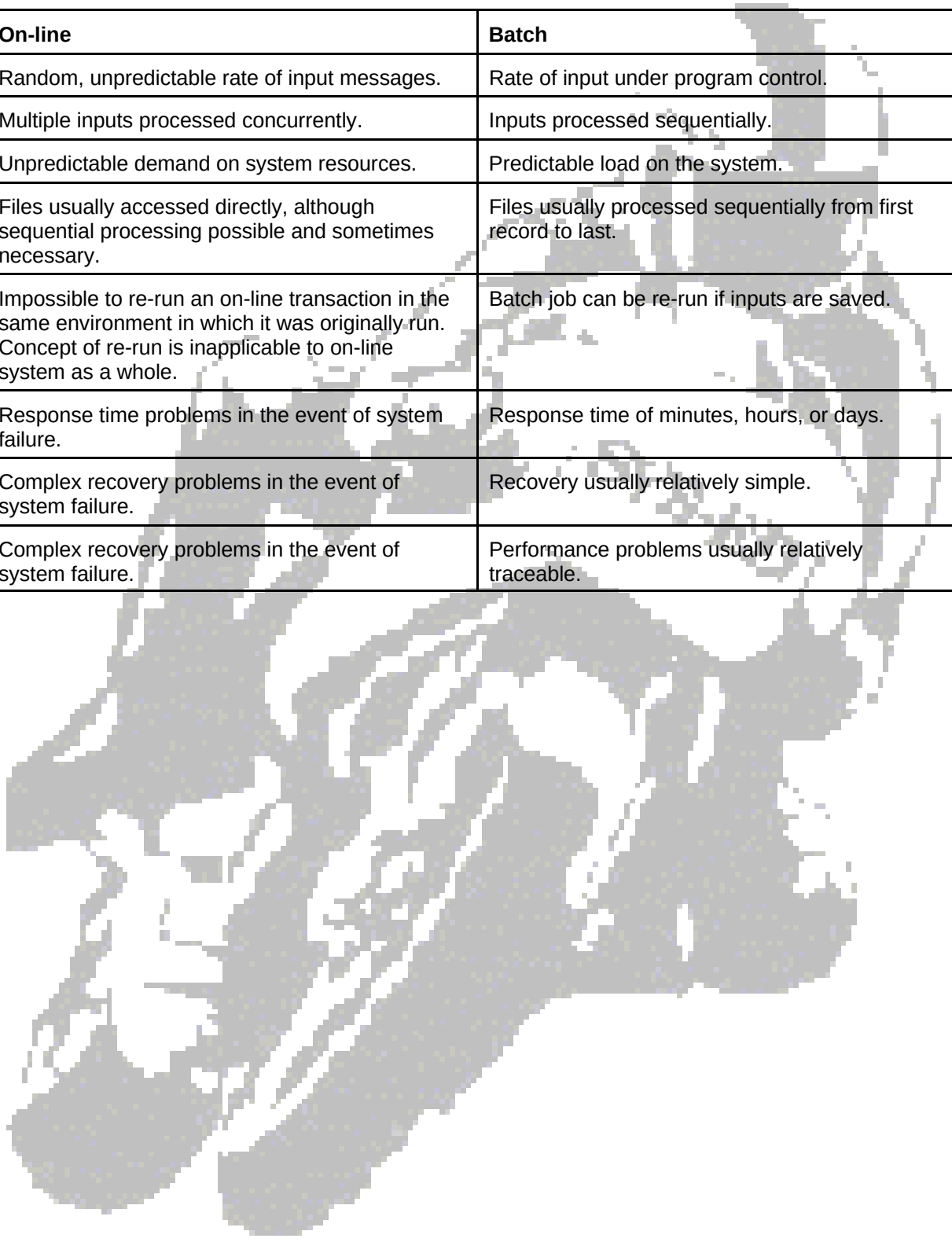
You will learn:

- The differences between on-line and batch.
- CICS application program memory management.
- The purpose of a task.
- Purpose of the CICS system programs.



1 On-line vs. Batch Processing

On-line	Batch
Random, unpredictable rate of input messages.	Rate of input under program control.
Multiple inputs processed concurrently.	Inputs processed sequentially.
Unpredictable demand on system resources.	Predictable load on the system.
Files usually accessed directly, although sequential processing possible and sometimes necessary.	Files usually processed sequentially from first record to last.
Impossible to re-run an on-line transaction in the same environment in which it was originally run. Concept of re-run is inapplicable to on-line system as a whole.	Batch job can be re-run if inputs are saved.
Response time problems in the event of system failure.	Response time of minutes, hours, or days.
Complex recovery problems in the event of system failure.	Recovery usually relatively simple.
Complex recovery problems in the event of system failure.	Performance problems usually relatively traceable.



2 CICS as an On-line System

CICS is a general purpose DB/DC system which runs as a single job under the operating system (z/OS, OS/390, VSE/VM).

CICS acts as an interface between user application programs and the operating system and provides macros and commands to request services, such as transmitting data between application programs and terminals.

CICS controls the simultaneous processing of input from many terminals by many application programs and therefore has its own task dispatcher.

In a batch program, I/O and work areas are defined within the program, or are acquired directly from the operating system. In CICS, memory is allocated from a dynamic storage area within the CICS partition.

A batch program issues I/O instructions directly to the operating system, whereas a CICS application program issues macros or commands which are implemented by CICS, using operating system I/O macros.

When a batch program waits for an I/O completion, the entire batch partition waits. When a CICS task waits for an I/O completion, other CICS tasks may continue to execute.

2.1 Multi-Tasking

A task is the basic unit of system activity managed by CICS. The resources of the system, such as storage and CPU cycles, are allocated among all the tasks in the system, using various strategies to optimize throughput and response time.

A task is an invocation of a particular transaction. A given transaction may be executed many times during the course of a day; each execution is a different task.

In general, a task, when given control of the CPU by CICS, executes until it issues a macro or command that requests an I/O operation. While that task is waiting for the I/O wait, CICS gives control of the CPU to another task.

At any point in time, in the CICS partition, there is one task using the CPU, and there may be one, several, or many tasks waiting for I/O completions. When the running task gives up control for an I/O wait, CICS selects one of the waiting tasks whose wait has ended, and gives it control of the CPU.

This process of sharing CPU utilization among all the tasks in the system, so that many tasks execute concurrently, is called multi-tasking.

2.2 Dynamic Storage Allocation

The CICS partition is divided into three basic components:

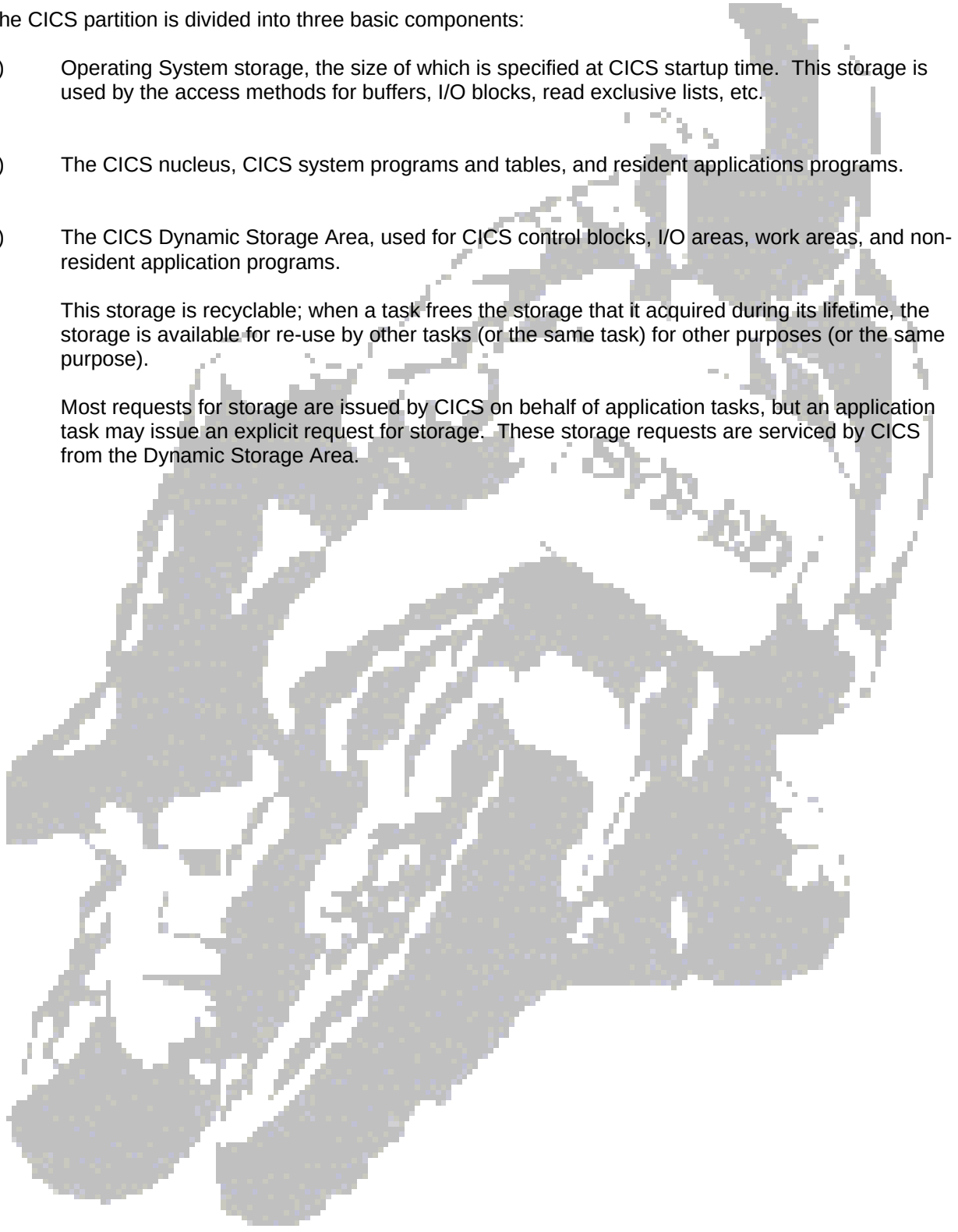
1) Operating System storage, the size of which is specified at CICS startup time. This storage is used by the access methods for buffers, I/O blocks, read exclusive lists, etc.

2) The CICS nucleus, CICS system programs and tables, and resident applications programs.

3) The CICS Dynamic Storage Area, used for CICS control blocks, I/O areas, work areas, and non-resident application programs.

   This storage is recyclable; when a task frees the storage that it acquired during its lifetime, the storage is available for re-use by other tasks (or the same task) for other purposes (or the same purpose).

   Most requests for storage are issued by CICS on behalf of application tasks, but an application task may issue an explicit request for storage. These storage requests are serviced by CICS from the Dynamic Storage Area.



3 CICS Structure and Components

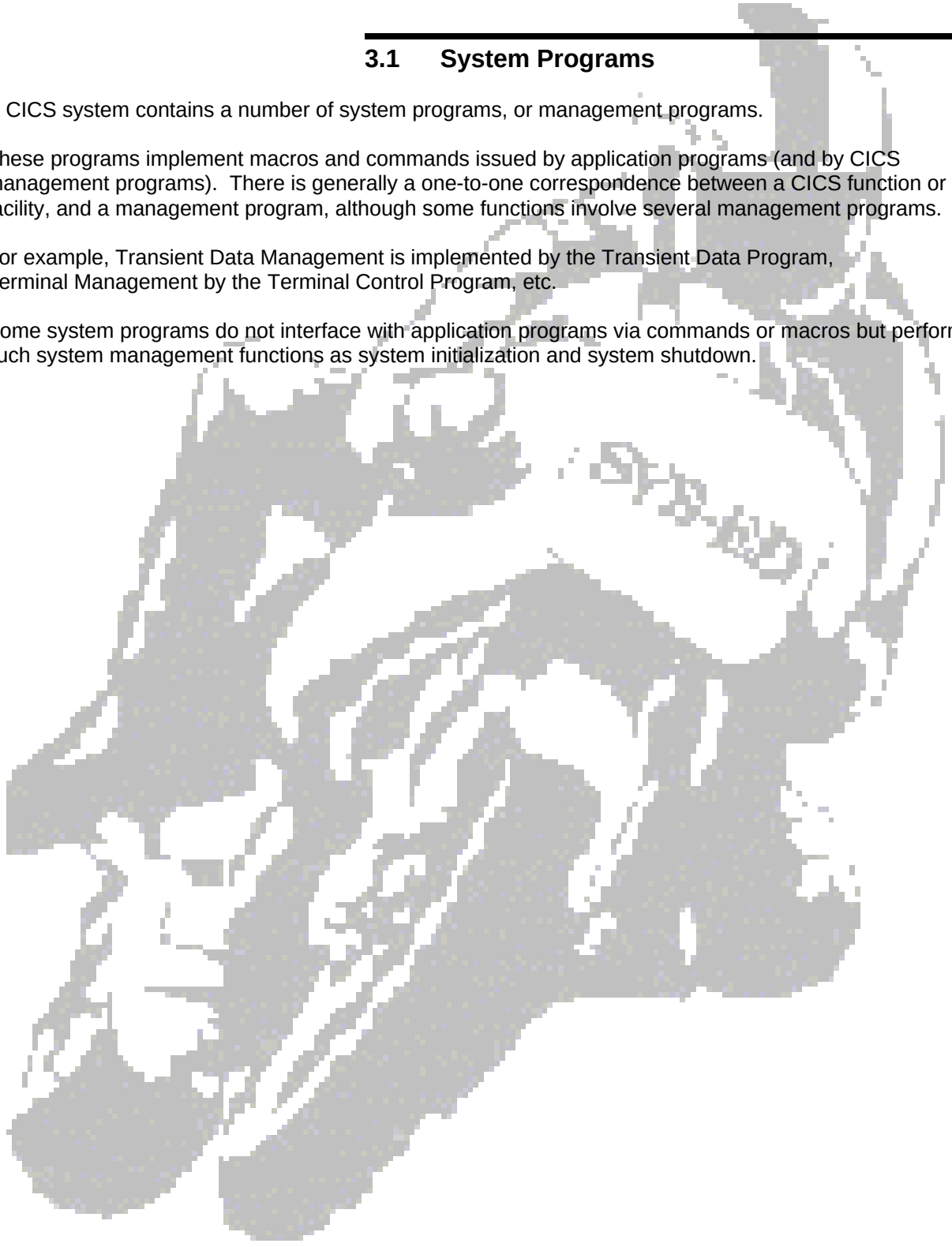
3.1 System Programs

A CICS system contains a number of system programs, or management programs.

These programs implement macros and commands issued by application programs (and by CICS management programs). There is generally a one-to-one correspondence between a CICS function or facility, and a management program, although some functions involve several management programs.

For example, Transient Data Management is implemented by the Transient Data Program, Terminal Management by the Terminal Control Program, etc.

Some system programs do not interface with application programs via commands or macros but perform such system management functions as system initialization and system shutdown.



3.2 System Tables

Associated with some of the system or management programs are system tables.

These tables allow the user to define and change the system environment by changing table entries, and/or by executing CICS with a different version of one or more tables.

Some of the more important tables are:

TCT: Terminal Control Table	Used by Terminal Management. The TCT contains descriptions of terminals, terminal status, hardware features selected, etc.
PCT: Program Control Table	Used by Task Management. Transaction identifiers are defined in the PCT, along with the program which is to be invoked by each transaction identifier.
PPT: Processing Program Table	Used by Program Management. All application programs are described in the PPT.
FCT: File Control Table	Used by File Management. All application data-sets are described in the FCT as to access method, block size, record size, services supported (such as UPDATE, ADD, etc.), status (open or closed), etc.
DCT: Destination Control Table	Used by Transient Data Management. The DCT contains descriptions of all the Transient Data destinations, or queues, used in the system.
JCT: Journal Control Table	Used by Journal Management. All the journals used in the system are described in the JCT.

3.3 Application Programs

Application programs to run under CICS may be written in Assembler Language, ANS COBOL, PL/I, or C.

The interface with CICS may be via commands (command level interface) or macros (macros level interface).

Application programs must be quasi-reentrant, so that a single copy of the program may be shared.

All application programs must be defined in the Processing Program Table (PPT).

3.4 Mapsets

A mapset is a part of the Basic Mapping Support facility which is created by the application programmer. It allows screen layouts to be described in symbolic, tabular form and relieves the programmer of many device-dependent considerations.

Mapsets are written using Assembler Language macros and must be described in the Program Processing Table (PPT).