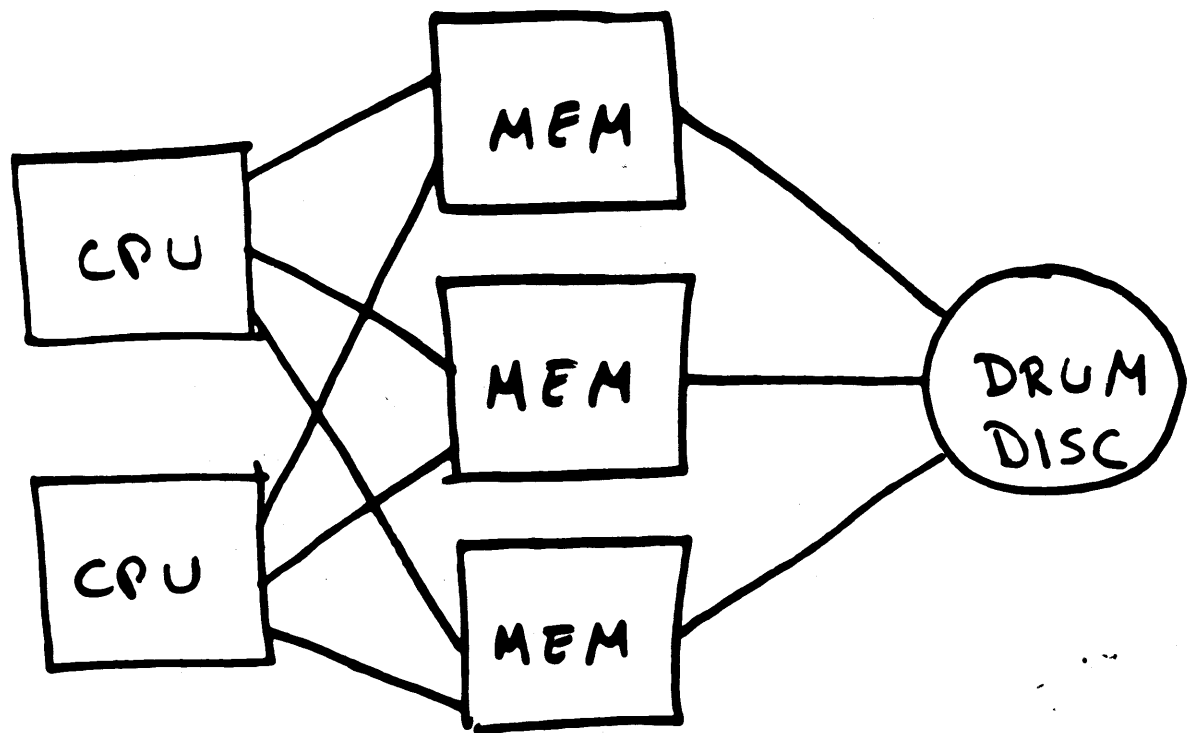


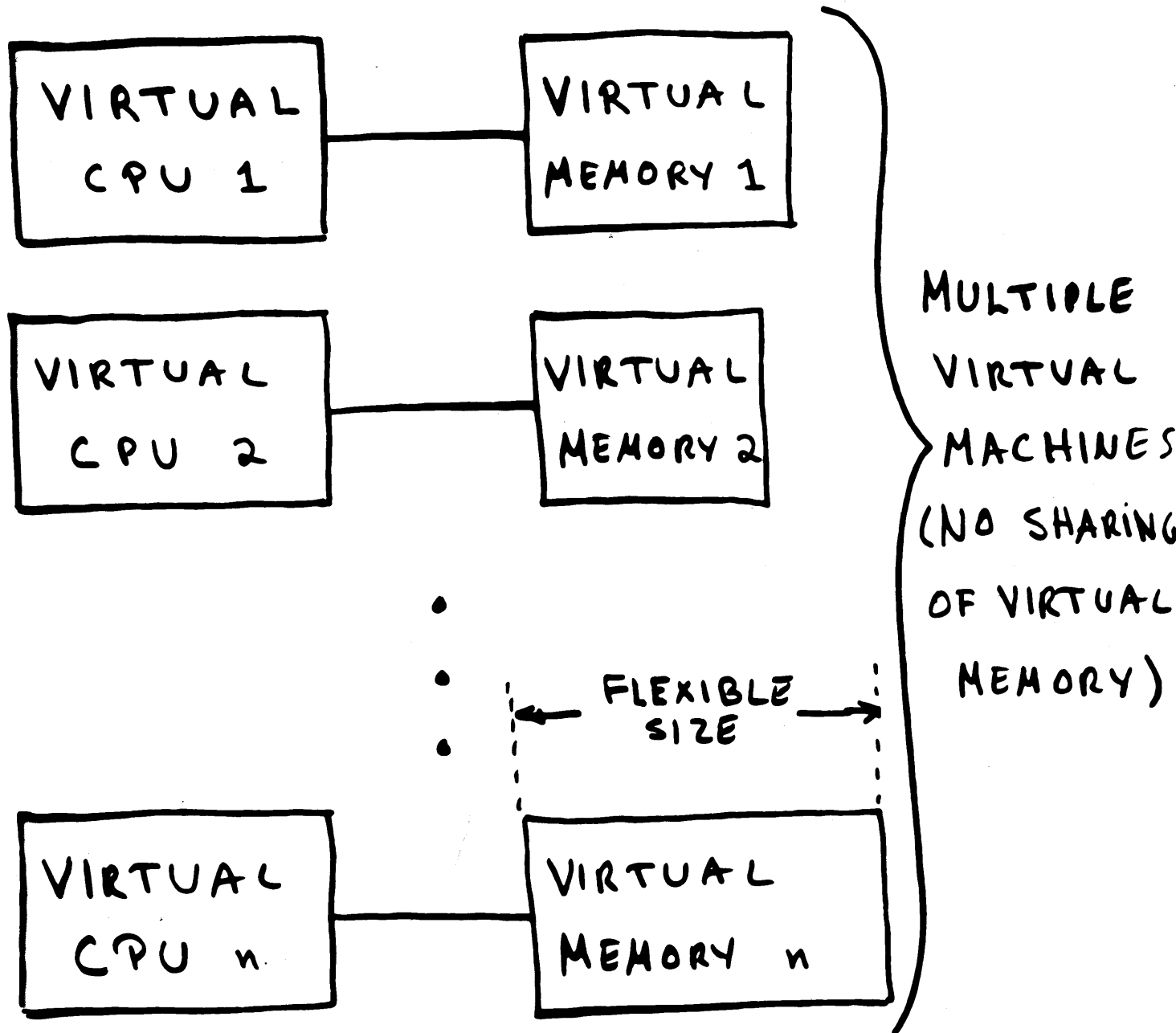
MULTICS ENVIRONMENT

- CONFIGURATION INDEPENDENT
- I/O not NECESSARY FOR ON-LINE STORAGE
- LARGE VIRTUAL MEMORY
- PL/I SUPPORT
- LIBRARY... SUPERVISOR ENTRIES ENVIRONMENT INTERFACES
- ADMINISTRATIVE CONTROLS

Q. ACTUAL HARDWARE



1. VIRTUAL MACHINE

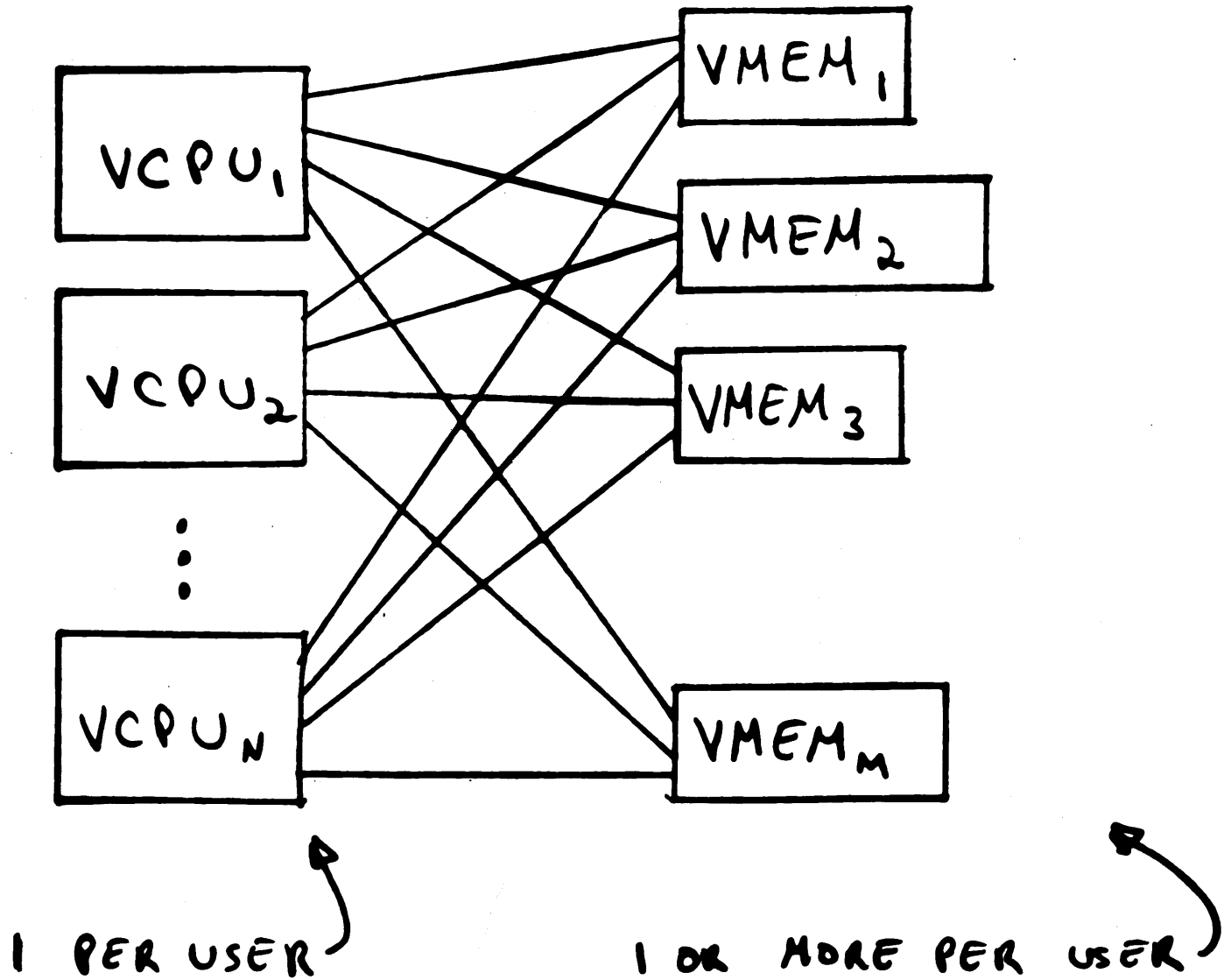


ADDRESSING :

GET 1376

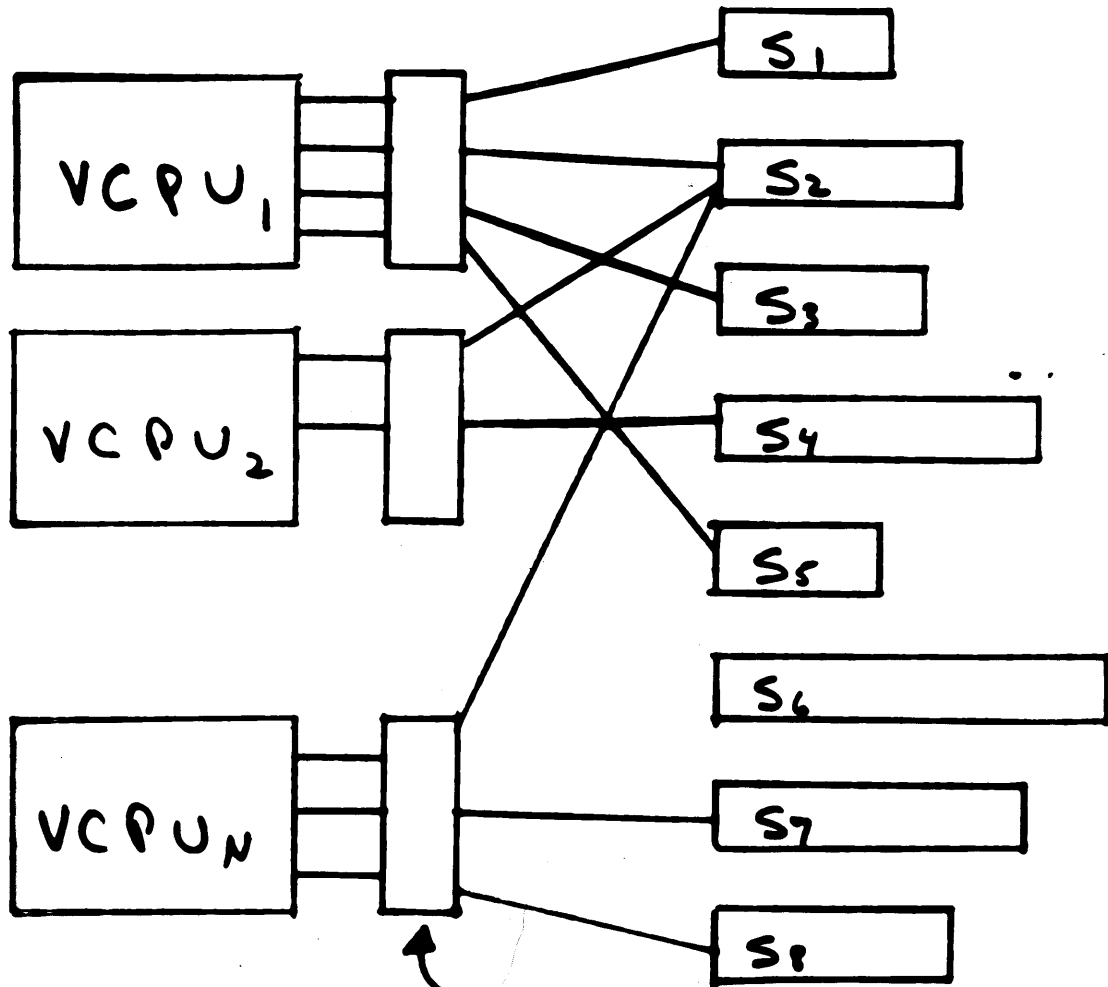
↑ ADDRESS IN VIRTUAL MEMORY

1.5 SHARING OF MEMORY SEGMENTS



ADDRESSING: GET 3,1376
MEMORY SEGMENT # ↑ (WORD # IN SEGMENT)

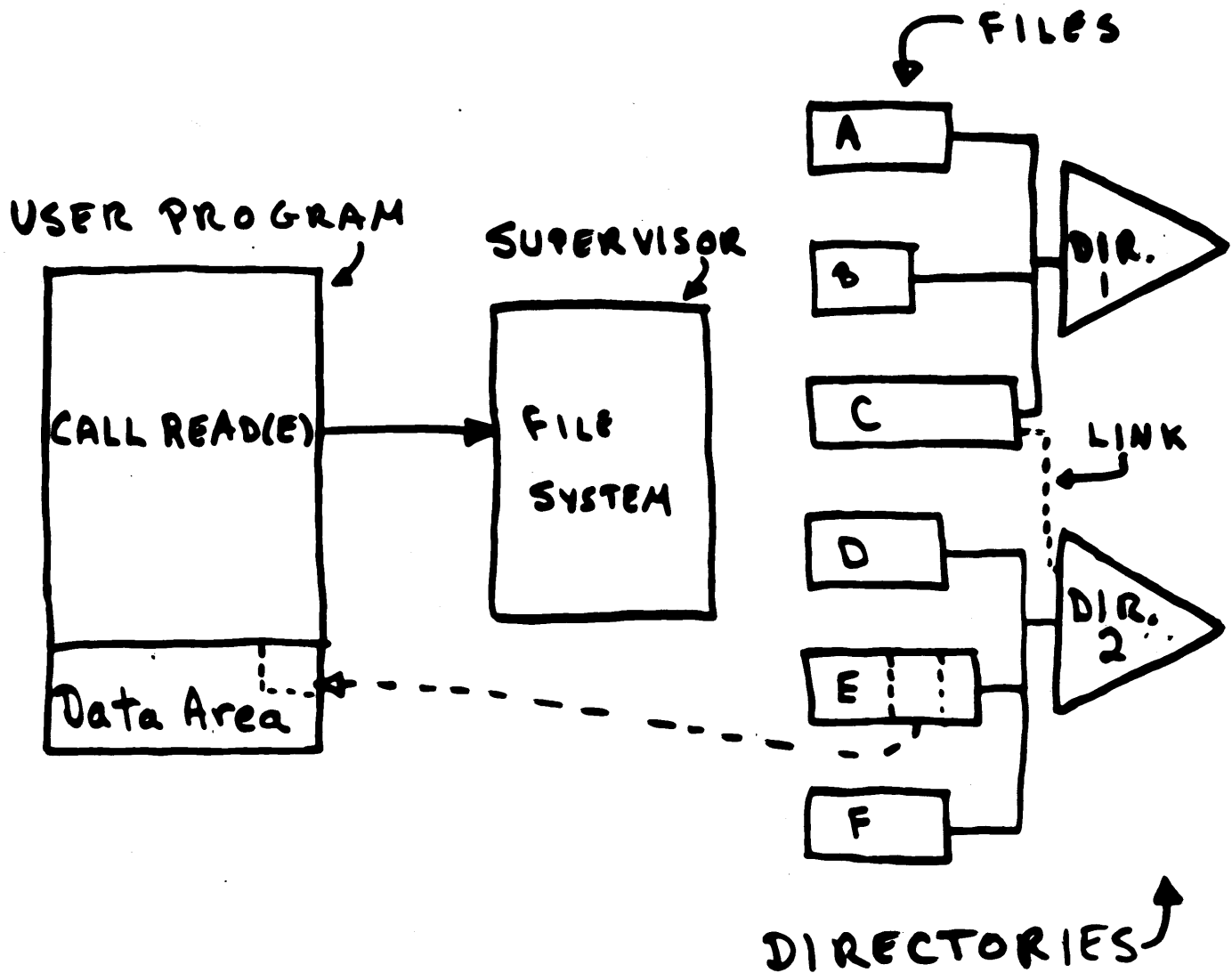
2 SEGMENTED MEMORY WITH MAPS



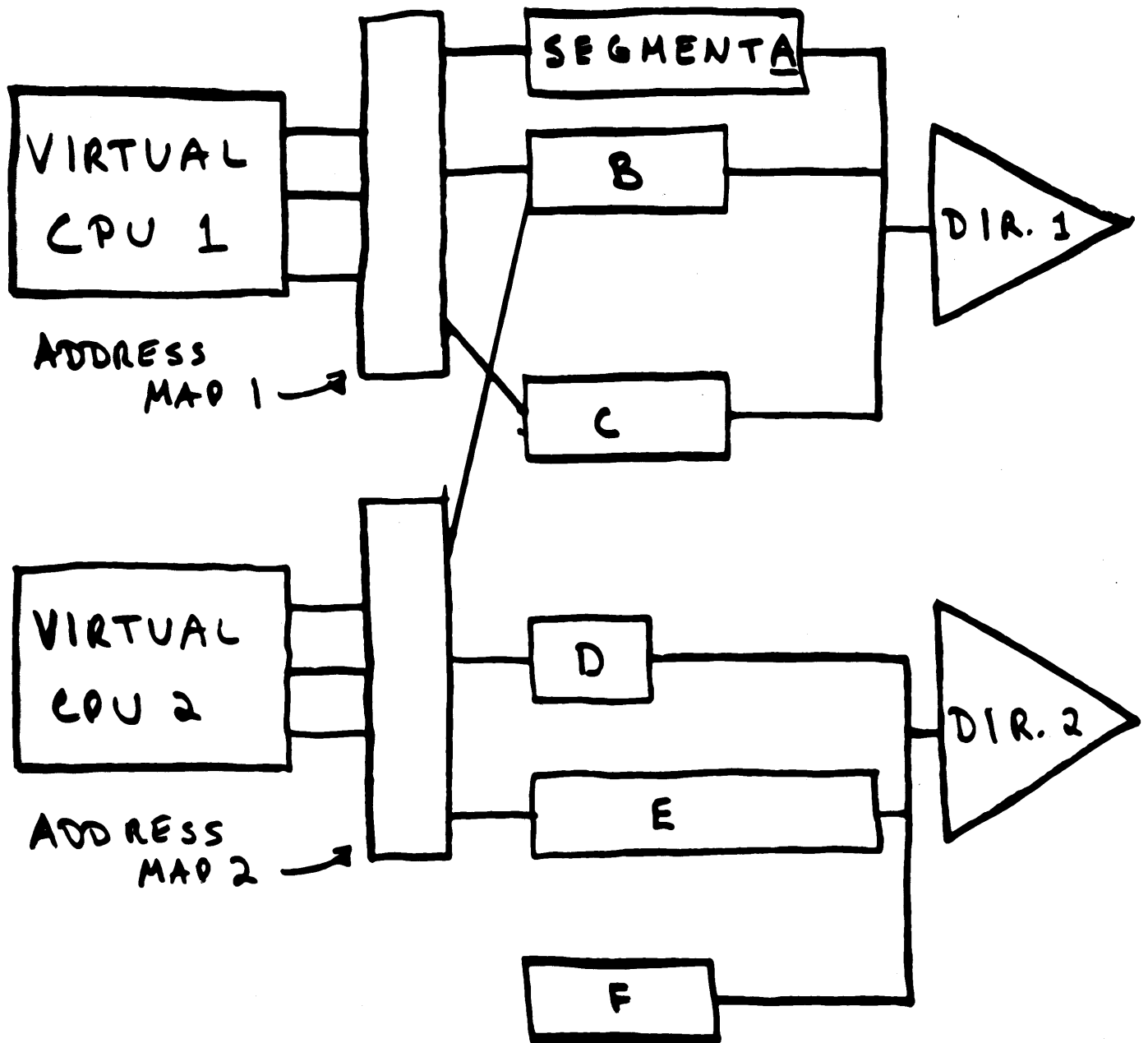
ADDRESS MAPS

SEGMENT # \longleftrightarrow PHYSICAL ADDRESS
IN REAL MEMORY

3. SYMBOLICALLY ADDRESSED FILE SYSTEM (USUAL APPROACH)



4. MULTICS VIRTUAL MEMORY



FILE ≡ SEGMENT

```
ADDEM: PROCEDURE;  
DECLARE SUM      FIXED,  
        I        FIXED,  
        C$(1000) FIXED  EXTERNAL;  
  
        SUM = 0;  
        DO I = 1 TO 1000;  
            SUM = SUM + C$(I);  
        END;  
        RETURN (SUM);  
  
END ADDEM;
```


ADDITIONAL IDEAS:

- CATALOG HIERARCHY
- ONE PROCESS PER USER
 - ↑ { VIRTUAL CPU
ADDRESS MAP
- MANY (>1000) SEGMENTS PER PROCESS
- ADDRESS MAP DYNAMICALLY CONSTRUCTED BY USER PROCESS
- BOTH PROCEDURES AND DATA ARE STORED IN SEGMENTS

TECHNIQUES USED

- DEMAND PAGING
- MULTIPROGRAMMING
- TIME ALLOTMENT
- HIGH PERFORMANCE DRUM
- SEGMENTATION HARDWARE

ADMINISTRATIVE CONTROLS

- ACCOUNTING
- QUOTAS
- PERIODIC REPORTS
- ACCESS
- LOGIN SEQUENCE AND
SYSTEM INTERFACE
- LIMITED SERVICE
- ANONYMOUS USERS
- DECENTRALIZED ADMINISTRATION
-

ACCOUNTING

- BY SHIFT
- CPU TIME
- CONSOLE TIME
- (MEMORY USAGE)
- DISK STORAGE
- SYSTEM SERVICES
PRINT / READ / PUNCH
TRANSLATE
- BY SYSTEM
GROUP
INDIVIDUAL } REPORTS