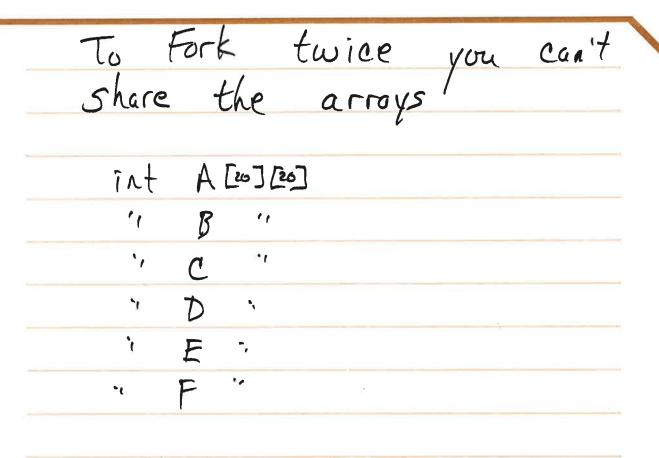
10/25/60

Mid (Wed) M (Thurs)	lterm Jovember	#2 3rd- 44h-	Mon Montwe Tues/Thu
			,

How to do Destroy Lock?
Difference with Proj 2: Every thread that wants to use a lock MUST do a CreateLock
Have every thread do a DestroyLector
You just need a counter-when
the count is Ø - delete it.
Final Tests for Parts 122
int main() { "/test/matmut", 15 Exec (matmut);
Exec (met); return 0; 3



```
Noid matmult 1() {

// use A, B, C arrays ] matmult code

}

void matmult 2() {

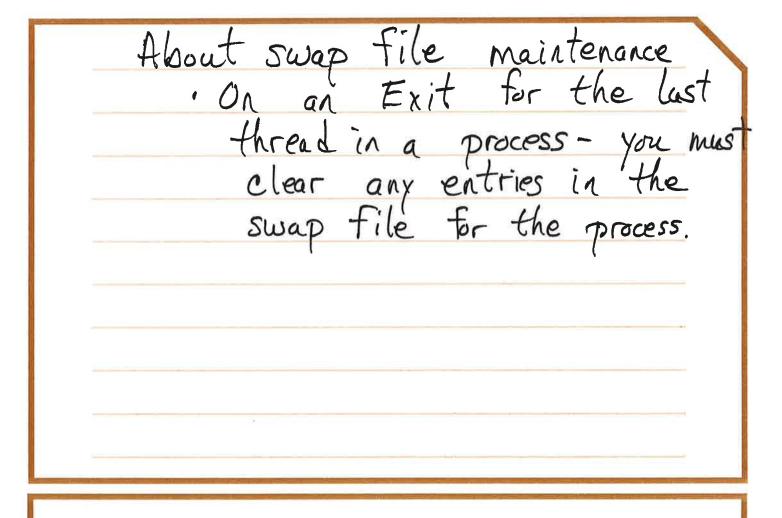
// use D, E, F arrays

int main() {

Fork (matmult 1);

Fork (matmult 2);

}
```



Protection Systems
The O.S. has the responsibility
for the protection of computer
resources

General Characteristics
An OS has resources (objects)

· These resources are managed by

the OS for user programs

- · Each resource has a unique identifier
- Each resource has a set of valid operations that can be performed on it

Protection systems main component object/resource set of a allowed processes (user	have 3
main component	5
· object/resource	to be protecte
· set of allow	ed operations
· processes (user	programs)

Domain Matrix Implementation
A 2D array
Domain: A set of pairs-object/rights
authorized operations
operations
 *
Rules: A user program can only be in one domain at a time
be in one domain at a time
 A user program can change their
domain
GO MCa IN
A "typical" Lomain is the user account.

Each object/rights pairs specifies:

the object being protected

the subset of allowable
operations the domain can
perform

In our matrix:

- · A row represents one domain
- · A column represents one object

A cell contains the rights for a single object

This is a kernel data structure

An example: aludra

overoges #users: 10,000

#files: 1,000

Protection Matrix:

(no group/world domain)

10,000 rows

** 10,000,000 columns
100,000,000,000 cells

Each domain (4 row) has 10,000,000 elements

but only 1000 entries are used

1000 => 99.8% of matrix is empty

Better approach: Don't estore
Better approach: Don't estore empty cells - only store rights that exist
rights that exist
No entry means no access
·
That gives us 2 choices:
1) By row (domain) > Protection Domai
That gives us 2 choices: 1) By row (domain) > Protection Domain 2) By column (object) > Access Control List
L13 C
Postartie Danie For pack dancie

Protection Domain : For each domain, we have a set of pairs (object, rights)

ACL: For each object we have a set of pairs (domain, rights)

ex: Protection Domain hash table	
de user1: (file4, rwx), (file2, r),	
numeric	
hashe user2:	
user3:	

ex: ACL			
tile1:	(user 1, rw),	$(user2, \times),$	
011			
file2:	3		
6:10			
file3:			

which method to choose for an con

Protection Donain:

+ Users can see all files they can access

+ Only one active Lumain, at a time, for a process, we can store a reference to that domain's protection in the process

ACL:

+ Can show all domains which can access a single object

Protection data is privileged (kernel access) • no direct user access
Issue: At any instant, the protection data determines what a domain can do W
It does NOT control what
a Lomain are AUTHORIZED to do
Policy
Protection data max not match the protection policy
Protection data max not match the protection policy Protection systems only validate against the protection data, NOT the protection policy

Situation Key Question:

· We build a brand new computer system - no user has logged in, yet

· We trust the administraters who are building the system

Protection data matches the protection policy

Question: Can we guarantee that
the system will allows
be in a state where
the policy & data are
the same?