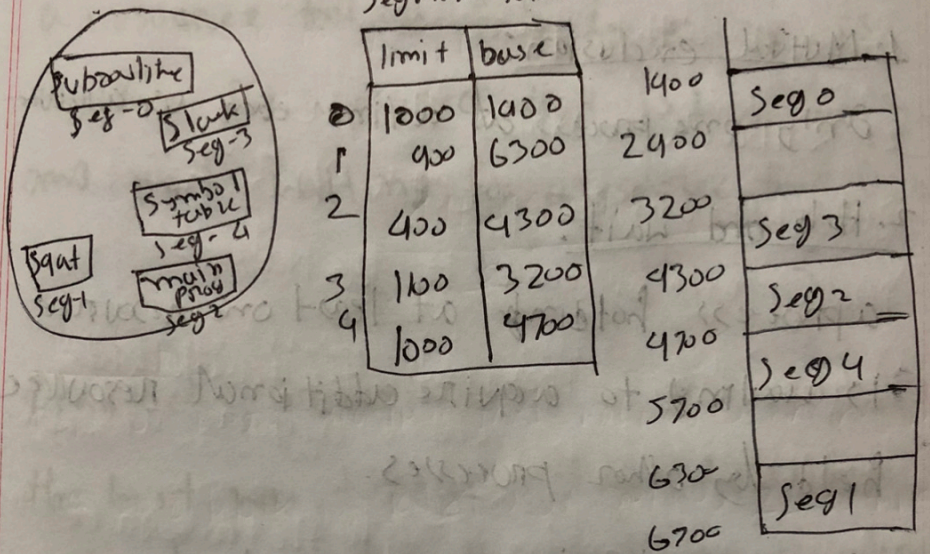
Example of segmentation



e

Physical Address: physical Address is the actual address of the data inside the memory the logical address is a virtual address and the program need physical memory for its execution. the user never deals with the physical Address.

* Testing complications:

Testing is a complicated process in multithreaded programs as compared to single threaded programs.

* Unpredictable results:

Multithreaded programs can sometimes lead to unpredictable result as they are essentially multiple parts of a program that are running at the same time.

* complications for porting Existing code.

A lot of testing is required for porting existing code in multithreading. Static variables need to be removed and any code of function calls that are not thread safe need to be replaced.

c

Safe State

If the system can allocate resources to the process in such a way that it can avoid deadlock. Then the system is in a safe state.

4 No question Ans

a

The solution of the Dining Phibsophers problem

The solution to the process synchronization problem is semaphores. A semaphore is an integer used in solving critical sections. The critical section is a segment of the program that allows go to access the shared variables or resources. In a critical section

b

The bounded buffer problem is a classic example of concurrent access to a shared resource. A bounded buffer lets multiple producers and multiple consumers share a signal buffer. producers write data to the buffer and consumers read data from the buffer.

* producess must block if the buffer is full
* consumers must block if the buffer is empty.

Synchronization

A bounded buffer with capacity N has can store N data items. the places used to store the data items inside the bounded buffer are called slots. ~~Whit~~ without proper

synchronization the following errors may occur.

* the producers doesn't block when the buffer is full.
* A consumers consumes an empty slot in the buffer.
* A consumer attempts to consume a slot that is only half-filled by a producer.
* Two producers writes into the same slot.
* Two consumers reads the same slot
* And possibly more.

e

Starvation is the problem that occurs when high priority processes keep executing and low priority processes get blocked for indefinite time.

an atomic action (independent by running Process) is needed, which means that only single process can run in that section at a time.

Semaphore has 2 atomic operations: wait() and signal(). If the value of its input S is positive, the wait() operation decrements it is used to acquire resource while entry. No operation is done if S is negative or zero, the value of the signal() operation's parameter S is increased, it used to release the resource once critical section is executed at exit.

5. No question Ans

a

Issue of Multithreading

* **Increased complexity:** Multithreaded processes are quite complicated. coding for these can only be handled by expert programmers.

* **Complications due to concurrency**

It is difficult to handle concurrency in multithreaded processes.

* **Difficult to Identify Errors.**

Identification and correction of errors is much more difficult in multithreaded processes as compared to single ~~th~~ threaded processes.

Name : MD. Atikur Rahman
ID : 211917009 1
Batch : 17
Program : Bsc in CSE
Course Code : CSE - 231

1 No. question Ans

a

Valid bit

A bit of information that indicates whether the data in a block is valid (1) or not (0). Locating data in the cache. Given an address we can determine whether the data at that memory location is in the cach.

Invalid bit

A invalid bit is a bit that is associated with a block of computer memory and indicates whether or not the corresponding block of memory

3No question Ans

Deadlock characterization

1. Mutual exclusion:

only one process at a time can use a resource

2. Hold and wait:

a process holding at least one resource is waiting to acquire additional resource held by other processes.

3. No preemption:

a resource can be released only voluntarily by the process holding it, after the process has completed its task.

4. circular wait:

there exists a set {P0, P1, ..., Pn} of

b

Semaphore is an integer variable which is used as a signal to allow or not allow a process to access the critical section of the code or certain other resources.

Semaphore properties

* S.value >= 0: value is the number of additional processes that can execute wait(s) without blocking.
* S.value < 0 = | value | is the number of processes already blocked.

* Atomicity: wait(s) and signal(s) are atomic also in the sense that no two processes can be inside wait() and

1. Preempting resources:- Take away the resources from the process and assign them to other processes.

2. Rollback:- When the process is taken away from the process, then roll back that process and restart it.

3. Aborting: Aborting the deadlocked Processes.

4. Shareable resource:- If the resource is shareable then all processes will get all resources, and a deadlock situation won't come.

waiting processes such that P0 is waiting for a resource that is held by P1. P1 is waiting for a resource that is held by P2, ..., Pn-1 is waiting for a resource that is held by Pn, and Pn is waiting for a resource that is held

b

Deadlocks prevention.

the best way to prevent deadlocks is by understanding how they form in the first place. Deadlock can be prevented by eliminating the necessary conditions for deadlock.

Some ways of prevention are as follows

*

signal(s) at hee the same time.

* Practical implementation of the wait/signal critical section:

  - Uniprocessor: disable interrupts
  - Multiprocessor: Software or hardware schemes.

c

Worst fit allocates a process to the partition which is largest usficient among the freely available partitions available in the main memory.

has been modified.

b

Segmentation Architecture.

* logical addr contains 2 tables
  <seg. no, offset>

* Segment table - maps 2 dimensional phy addr
  - base: contains the starting physical addr
  - limit: specifies the length of seg

* Segment table base register (STBR)
  points to the seg table's location in memory

* Segment table length register (STLR)
  Indicates no. of segments used by program
  seg. no. s is legal if s ≤ STLR.