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Q1.
a) Execute user programs and make solving user probs easier
b) make computer system convenient to use
c) use the computer HW in an efficient manner

Q2.
The system is easy to debug, and security problems are easy to solve. Virtual machines also provide a good platform for operating system research since many different operating systems may run on one physical system.

Q3.
The process for a context switch by the kernel is as follows, the kernel saves the context of the old process in its PCB and loads the saved context of the new process that is scheduled to run. Essentially context switching requires performing a state of save of the current process and a state of restore of a different one.

Q4.
a)
One advantage of synchronous buffering is that it allows for a rendezvous between the sending and receiving processes which thereby synchronizing the processes. A disadvantage of the synchronous buffering is that there is only one communication at a time and if rendezvous is not required then the processes are blocked until the communication is completed and in the meantime its unable to complete any other actions. Now with asynchronous buffering the advantage is that process flow is not restricted or blocked while waiting for a response. However, a disadvantage of asynchronous is that processes must be able to handle multiple communications which requires more functions to be implemented in the system.
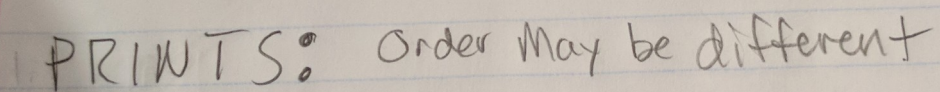b)
An advantage of automatic buffering is it provides a queue with indefinite length, this ensures the sender will never have to block while waiting to copy a message. A disadvantage of automatic buffering is that there are no specifics on how automatic buffering will be provided, one scheme may reserve sufficiently large memory where much of the memory is wasted. An advantage of explicit buffering is it specifies how large the buffer is which means it is less likely memory will be wasted with explicit buffering. However a disadvantage to explicit buffering is that the sender may be blocked while waiting for available space in the queue.
c)
The advantage of fixed size messages is that because we know the size of them we know how many will fit in a buffer of a specific size. The disadvantage is that if we have a buffer that is too small it will not hold the entire message. With a variable sized message we don't know the size so we don't know how many our buffer will hold. This means we will have to have a system in place to be able to transfer these by first putting them in shared memory which is a disadvantage, however, because of this our system is more adept at handling different size messages which makes it more flexible in it's use.

Q5.
There are 4 processes created, below is the output and structure of code:

HW1   Q.5

```
                                    55  3
                                    30  2
                              10    5   +      1
                             | m | n | ct | mt |
              50   3  50
          | ∅ | 30 | 2 | + |          | ∅ | 55 | 3 | 1 |

          | ∅ | 50 | 3 | 50 |
```

PRINTS: Order May be different

1.	n = 30	mult = 1
2.	n = 30	mult = 1
3.	n = 55	mult = 1
4.	n = 55	mult = 1
5.	n = 50	mult = 50
6.	n = 50	mult = 50