# Networking Operating Systems (CO32010)

## 1. Operating Systems

| | |
|---|---|
| 1.1 | NOS definition and units |
| 1.2 | Computer Systems |
| 1.3 | Multitasking and Threading |
| 1.4 | Exercises |

**Objectives:**

- To outline the main areas covered in the module.
- To define some of the basic terminology of operating systems.
- To define the main components of a network operating system.
- To define the differences in operating systems.



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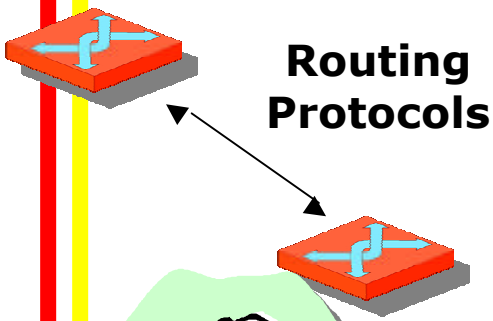
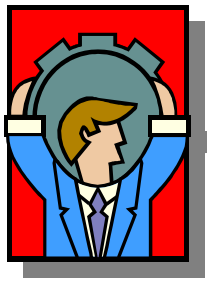
The **infrastructure** that allows the reliable distribution of processes, files systems, networking components, networking protocols, and other associated components in order to produce a system which is reliable and secure, and which operates within a required specification.

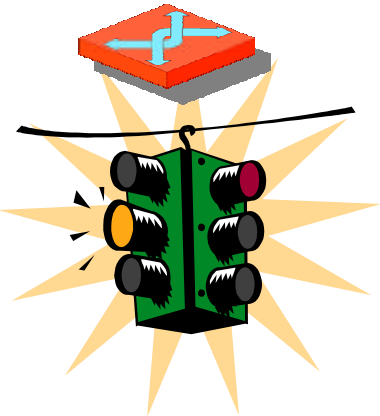
**Encryption**



**Routing Protocols**



**Distributed Processing**



**Router Programming and Security**

**Processing and scheduling**

**Distributed File Systems**



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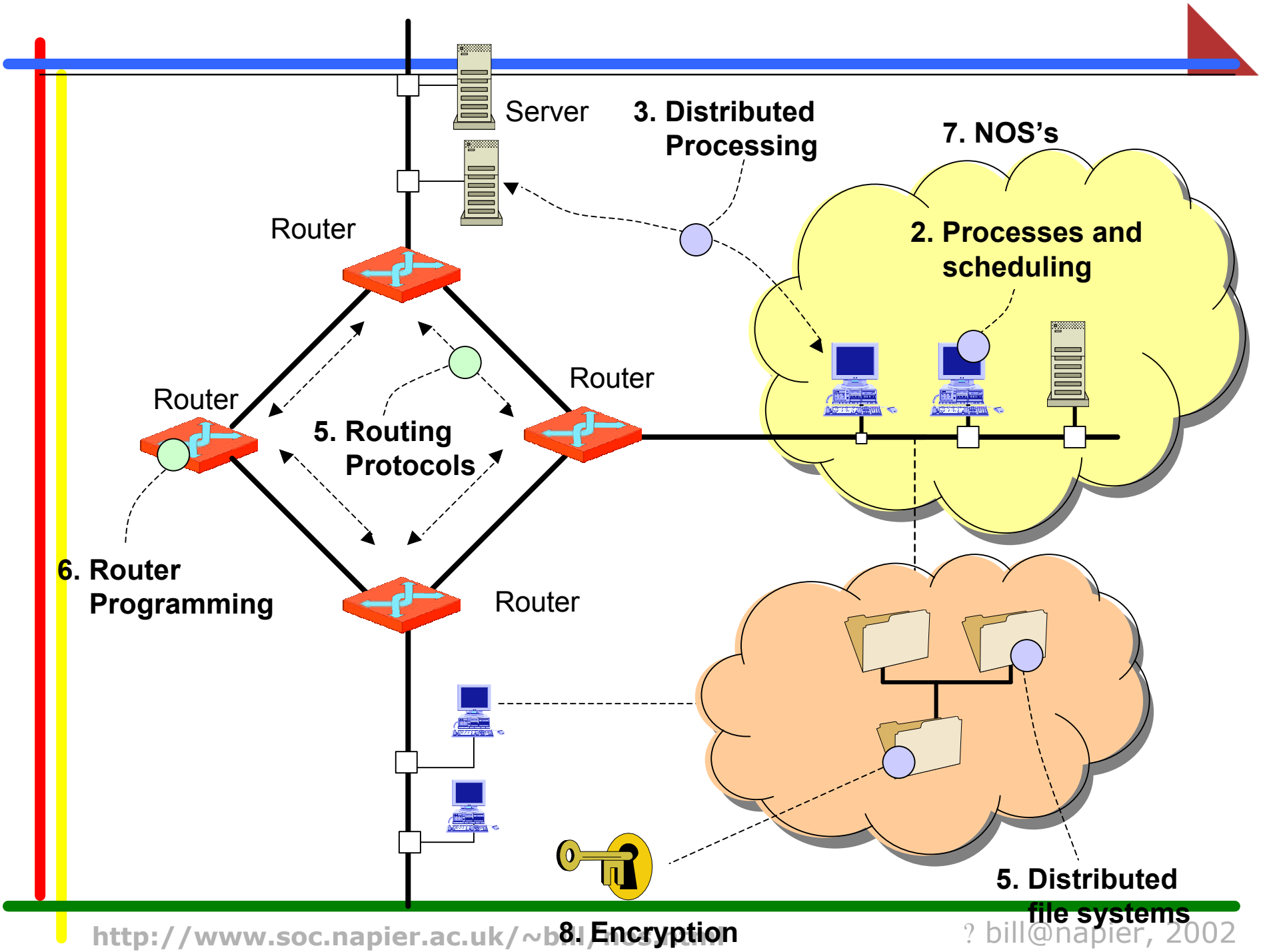
Server
3. Distributed Processing
7. NOS's
Router
2. Processes and scheduling
Router
Router
5. Routing Protocols
6. Router Programming
Router
5. Distributed file systems
8. Encryption

# Areas covered

- **Introduction**. This unit provides a basic introduction to some of the concepts involved with operating systems, such as the basic definition involved in computer systems.
- **Processes and Scheduling**. This unit outlines some of the key concepts in the operation of an operating system, especially related to processes, and scheduling.
- **Distributed Processing**. This units outline some of the standard methods which are used to control the distribution of processes over a network. A key focus is on the RPC protocol, which is a standard method for distributing processes.
- **Distributed File Systems**. This unit outlines some of the methods which can be used to distribute file systems over a network. A key focus of this unit is the NFS standard, which can be used to distribute file system over a network.
- **Routing Protocols**. This unit outlines some of the key methods, and problems that occur with standard routing protocols
- **Routers and ACLs**. This unit outlines how routers are programming, and how ACLs can be applied to facilitate network security.
- **Encryption**. This unit outlines the principles of methods which allow data to be encrypted.
- **Networking Operating Systems**. This unit outlines the three main networking operating systems: UNIX, Novell NetWare and Microsoft Windows.


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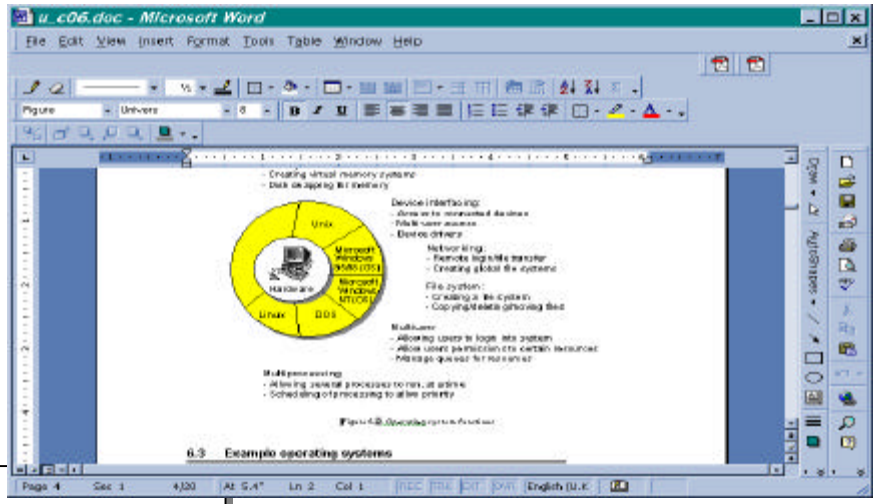
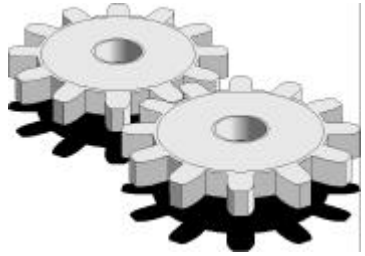
# Hardware, Operating Systems and User Interfaces

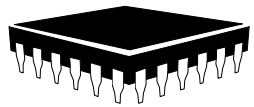
**User interface:**
- Microsoft Windows (Windows 95/NT/2000/XP).
- Microsoft Windows 3.1.
- X-Windows.

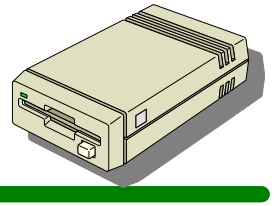



**Operating system:**
- Microsoft Windows (Windows 95/NT/2000?XP).
- DOS.
- UNIX/Linux.
- VMS.
- Novell NetWare.



**Hardware:**
- *x*86 architecture.
- SPARC architecture.
- Apple architecture.



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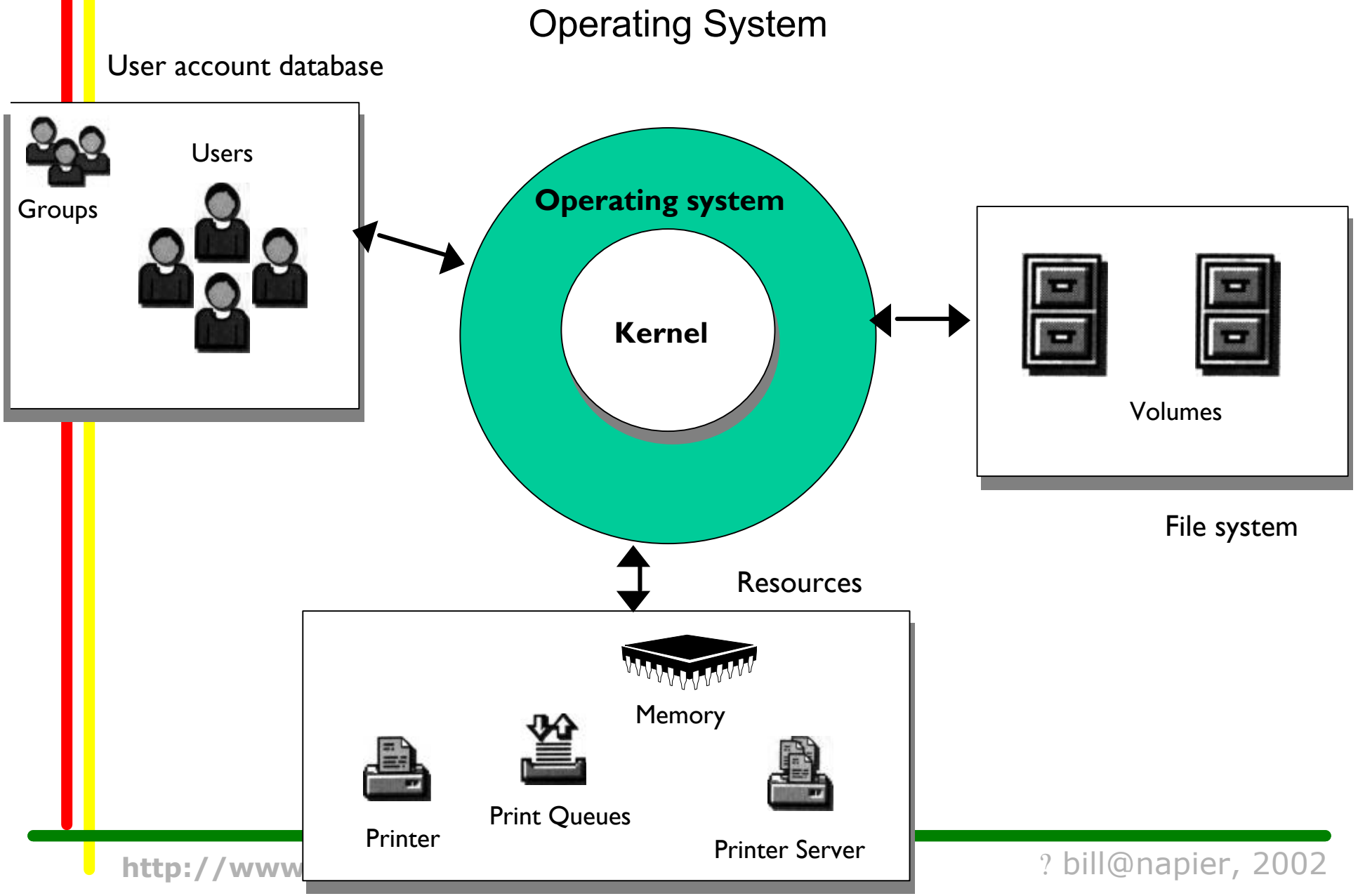



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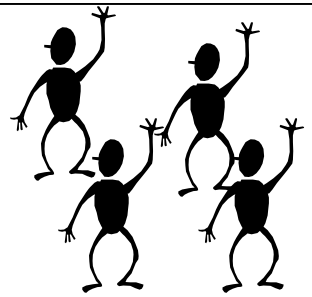
# Operating system characteristics

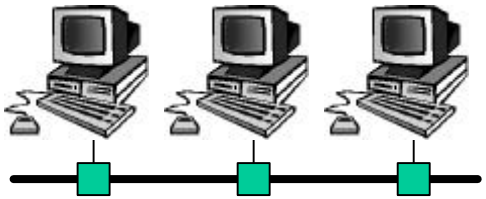
**Single-user**

**Multi-user**



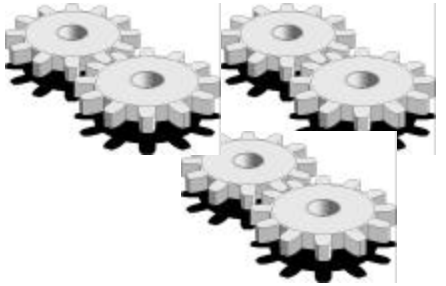
**Stand-alone**

**Networked**



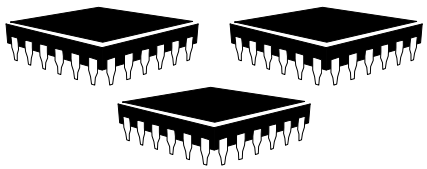
**Single-tasking**

**Multitasking**



**Single processor**

**Multi-processor**





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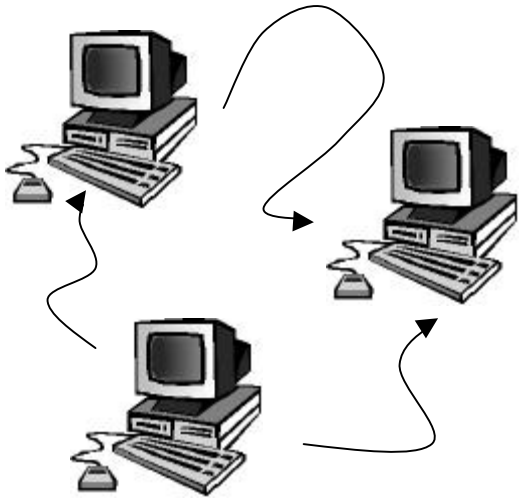
# Operating system characteristics

**Local processing**

**Distributed processing**



**Embedded**

**Non-embedded**



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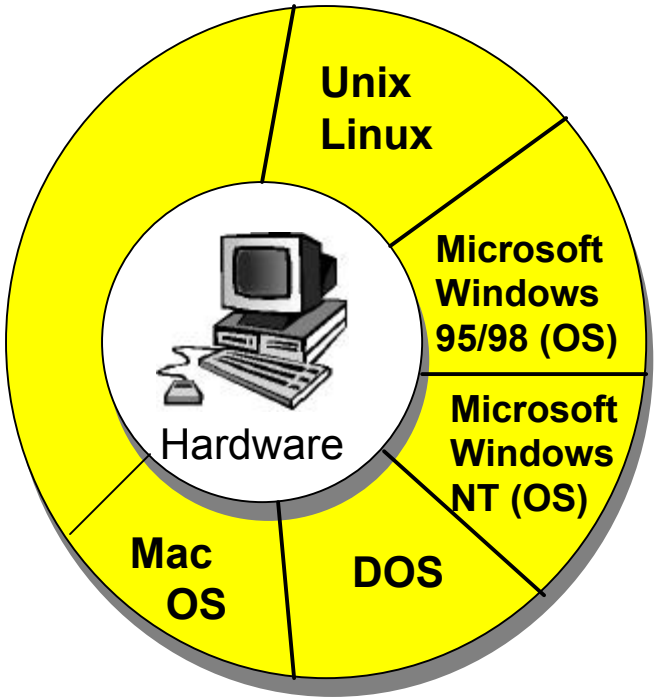
# Operating Systems

**Memory:**
- Creating virtual memory systems
- Disk swapping for memory




**Device interfacing:**
- Access to connected devices
- Multi-user access
- Device drivers

**Networking:**
- Remote login/file transfer
- Creating global file systems

**File system:**
- Creating a file system
- Copying/deleting/moving files

**Multi-user**
- Allowing users to login into system
- Allows users permissions to certain resources
- Manage queues for resources

**Multiprocessing**
- Allowing several processes to run, at a time
- Scheduling of processing to allow priority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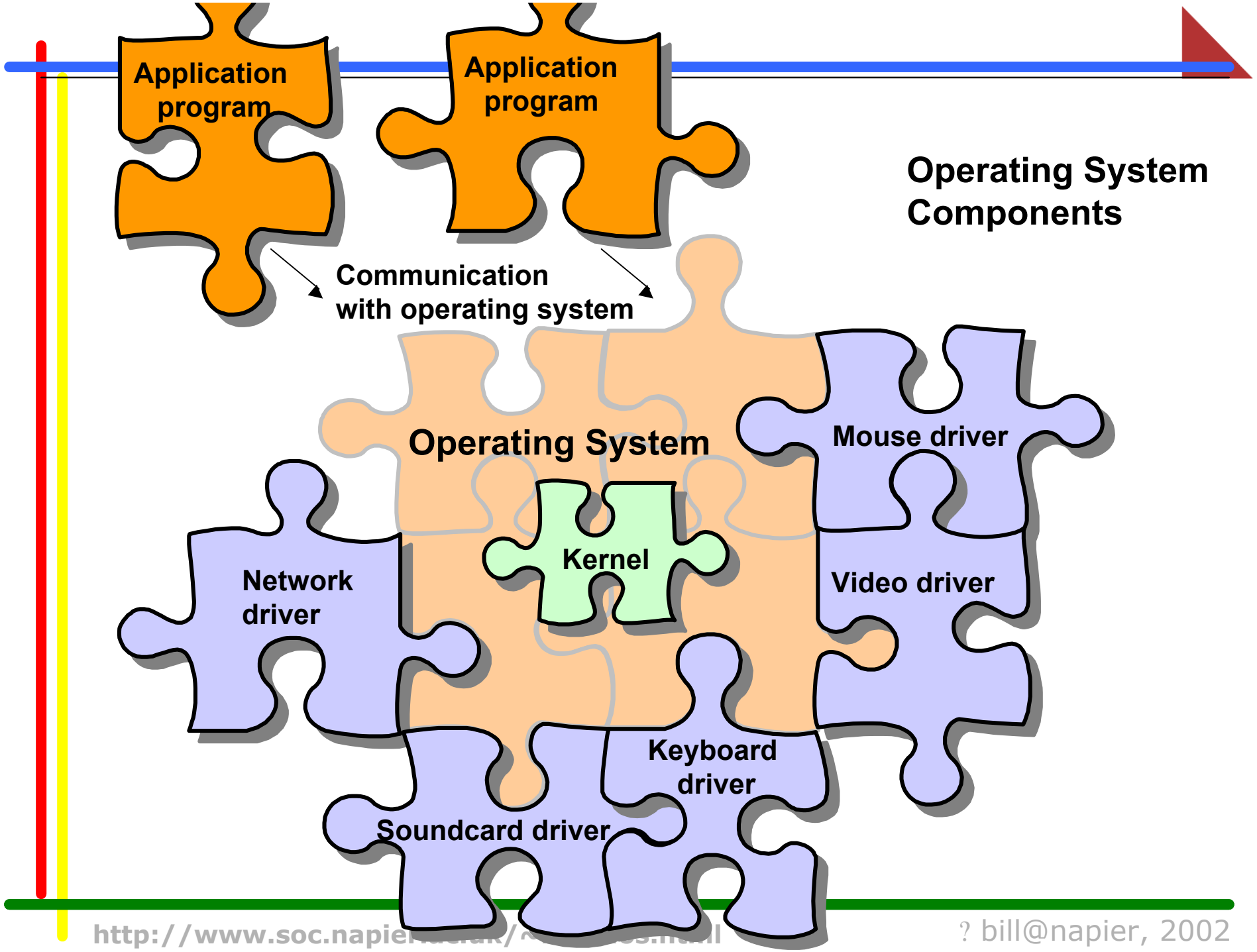



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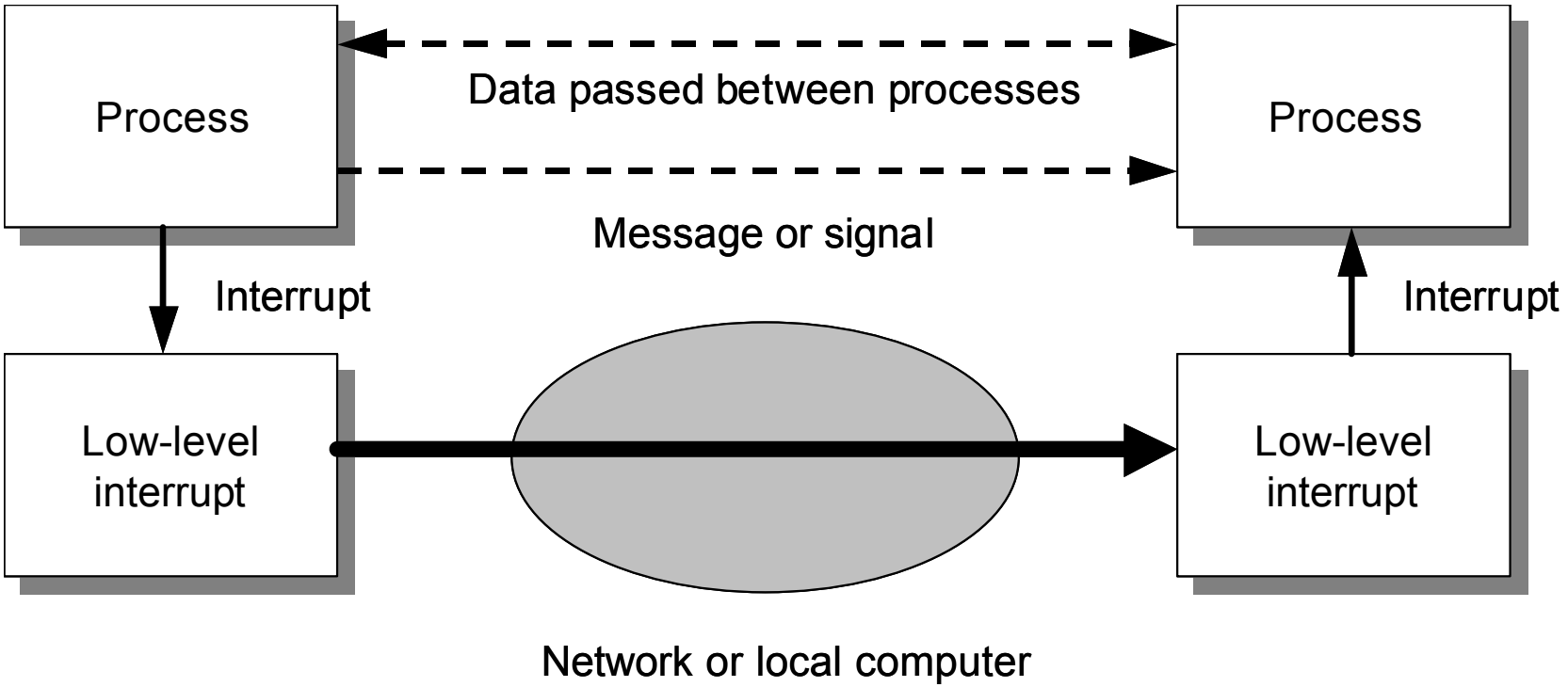
# Information passed between processes





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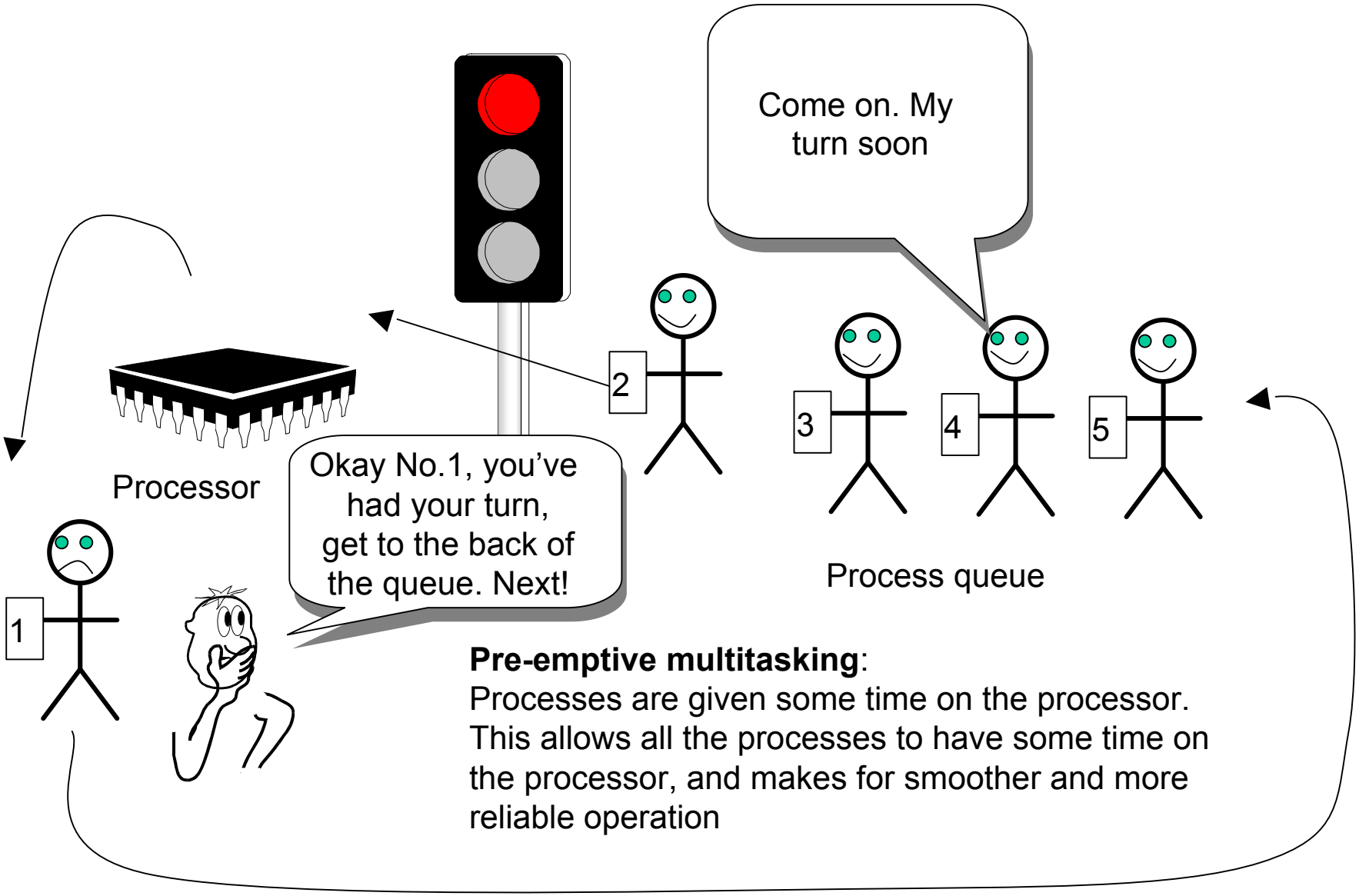
# Preemptive Multitasking




**Pre-emptive multitasking**:
Processes are given some time on the processor. This allows all the processes to have some time on the processor, and makes for smoother and more reliable operation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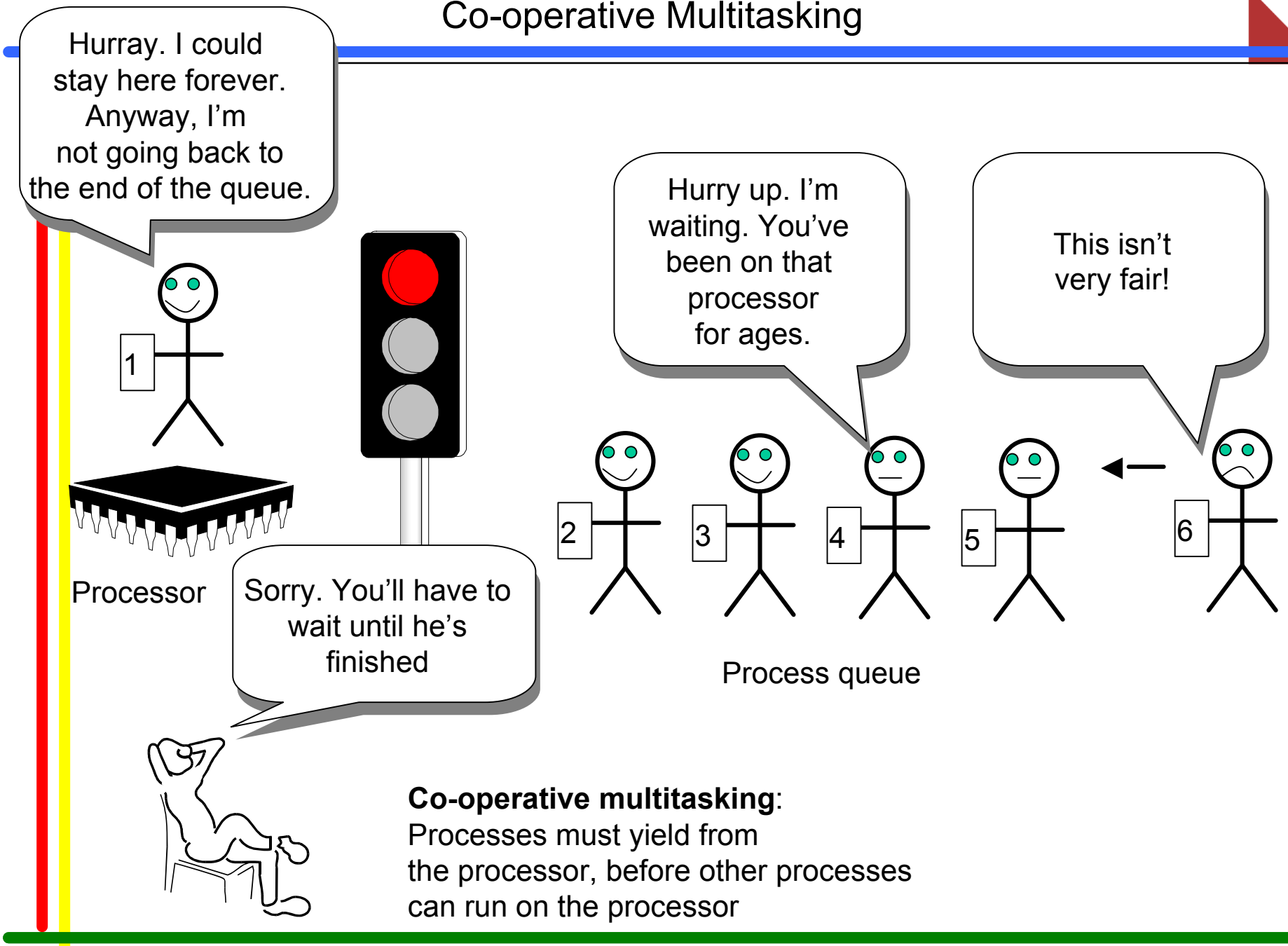
# Co-operative Multitasking




**Co-operative multitasking**:
Processes must yield from the processor, before other processes can run on the processor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# Splitting a process into threads