G.H. Raisoni College of Engineering and Management, Wagholi

(An Autonomous Institute Affiliated to Savitribai Phule Pune University)

TAE 2

Operating System

Deadlock Detection

Introduction to Deadlock

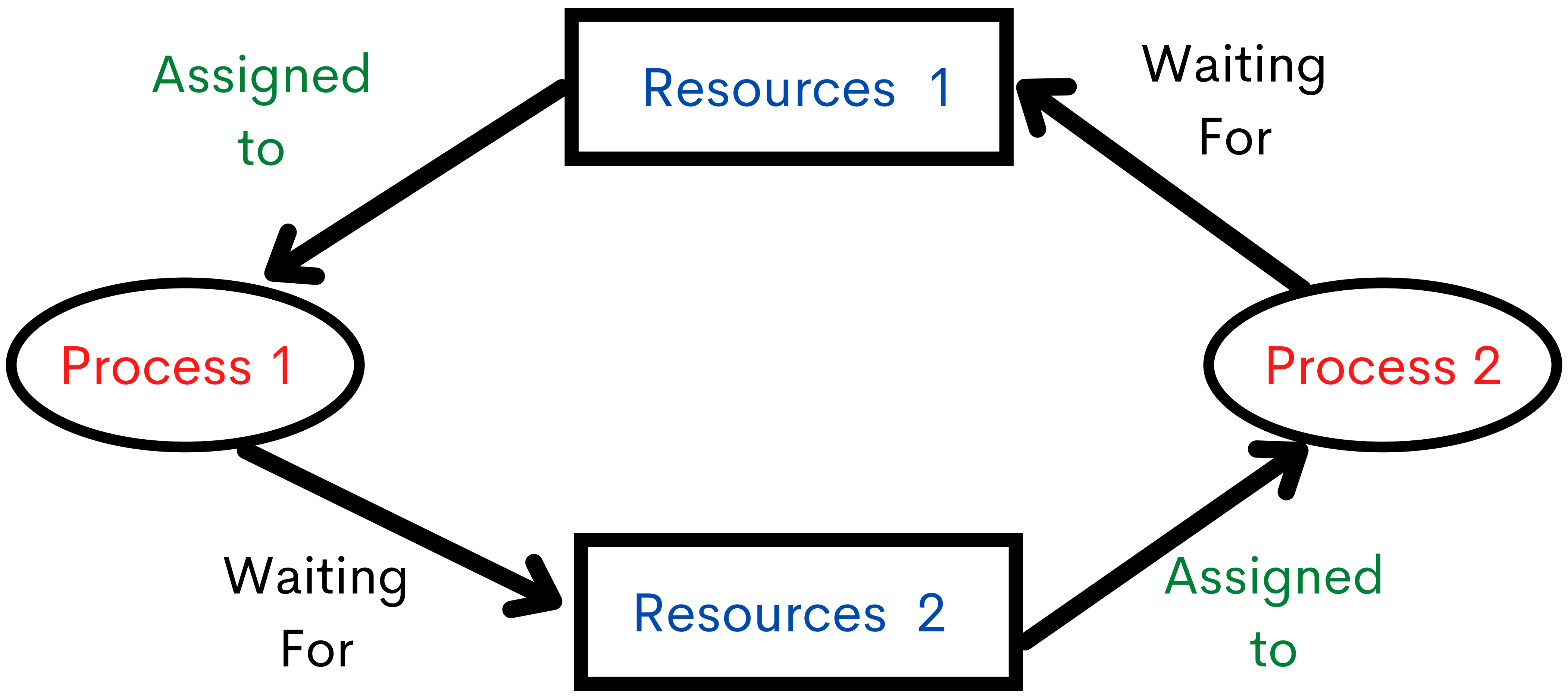
A Deadlock is a situation where each of the computer processes waits for a resource that is being assigned to another process. In this situation, none of the processes gets executed since the resource it needs, is held by some other process which is also waiting for some other resource to be released.

Deadlock Detection

If deadlock prevention and avoidance are not done properly then the system may enter a deadlock state. So, we need to detect the deadlock and recover it.

1. If resources have a single instance –

In this case for Deadlock detection, we can run an algorithm to check for the cycle in the Resource Allocation Graph. The presence of a cycle in the graph is a sufficient condition for deadlock.



2. In the above diagram, resource 1 and resource 2 have single instances. There is a cycle R1 → P1 → R2 → P2. So, Deadlock is Confirmed.

3. If there are multiple instances of resources –

Detection of the cycle is necessary but not sufficient condition for deadlock detection, in this case, the system may or may not be in deadlock varies according to different situations.

The deadlock once detected can be removed by the following ways:

- **Resource Preemption:** This involves taking back the resources from the processes allocating it to other processes so that deadlock is removed.

- **Terminating the process involved in the deadlock:** This involves killing all the processes involved in the deadlock until the deadlock is removed.

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