

## 5.1

a)

First Army	Second Army	Variable (flag = false)
while (true)		
while (flag !=false)		
temp = true		
	while (true)	
	while (flag !=false)	
	temp = true	
	flag = temp	flag = true
	critical_section()	
flag = temp		Flag = true
critical_section()		

b)

Five-Headed Dragon	Three-Headed Dragon	Variable (counter = 0)
	while (true)	
	temp = counter +1	
	counter = temp	counter = 1
	if (counter == 3)	
	while (true)	
	temp = counter +1	
	counter = temp	counter = 2
	if (counter == 3)	
	while (true)	
	temp = counter +1	
	counter = temp	counter = 3
	if (counter == 3)	
	critical_section()	
while (true)		
temp = counter +1		
counter = temp		counter = 4
if (counter == 5)		
while (true)		

temp = counter +1		
counter = temp		counter = 5
if (counter == 5)		
critical_section()		

c)

Thread 0	Thread 1	System.Object mutex	System.Object mutex2
Monitor.Enter(mutex)		locked by thread 0	
	Monitor.Enter(mutex2)		locked by thread 1

d)

Thread 0	Thread 1	SemaphoreSlim ss [counter: 0]
	while (true)	
	if (ss.Wait(500))	
	else	
	ss.Release()	[counter: 1]
while (true)		
ss.Wait()		[counter: 0]
critical_section()		
	while (true)	
	if (ss.Wait(500))	
	else	
	ss.Release()	[counter: 1]
	while (true)	
	if (ss.Wait(500))	[counter: 0]
	critical_section()	