

CSC552 – Advanced UNIX Programming

Introduction

Dr. L. Frye
Kutztown University



Terminology

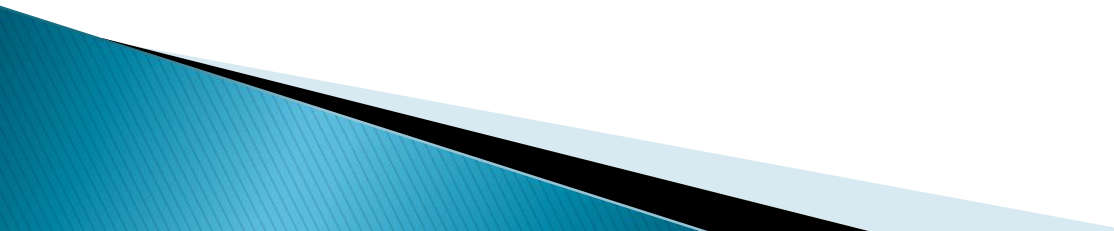
- ▶ Concurrency
- ▶ Concurrency control
- ▶ Communication

- ▶ Client/Server computing
 - Advantages?
 - Disadvantages?
- ▶ Distributed computing
 - Advantages?
 - Disadvantages?

More Terminology

- ▶ Context switch
 - ▶ Context-switch time
 - ▶ Quantum

 - ▶ Multiprogramming
 - ▶ Timesharing

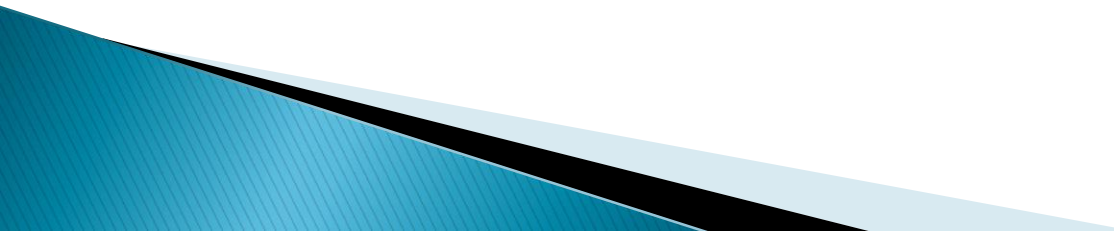
 - ▶ Atomic operation
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Typical Times

Item	Time	Scaled time in human terms (2 billion times slower)
processor cycle	0.5 ns (2 GHz)	1 second
cache access	1 ns (1 GHz)	2 seconds
memory access	15 ns	30 seconds
context switch	5,000 ns (5 μ s)	167 minutes
disk access	7,000,000 ns (7 ms)	162 days
quantum	1000,000,000 ns (100 ms)	6.3 years

Discussion Question

- ▶ Over past decade
 - Processor speeds increased exponentially
 - Disk access times have not decreased exponentially

 - ▶ What does this mean or what are the implications?
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Nonreentrant Code

```
int g_var = 1;
```

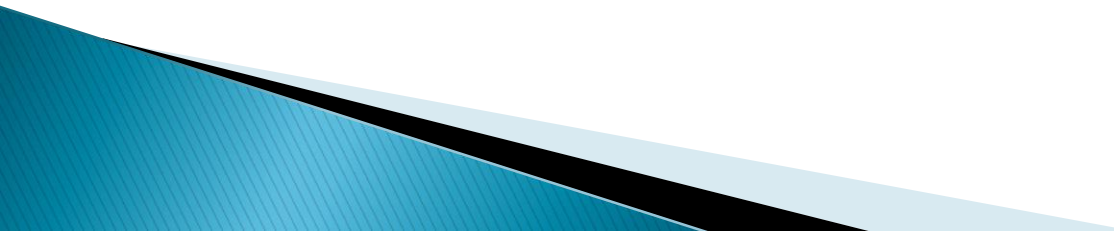
```
int f() {  
    g_var = g_var + 2;  
    return g_var;  
}
```

```
int g() {  
    return f() + 2;  
}
```

```
int main() {  
    g();  
    return 0;  
}
```

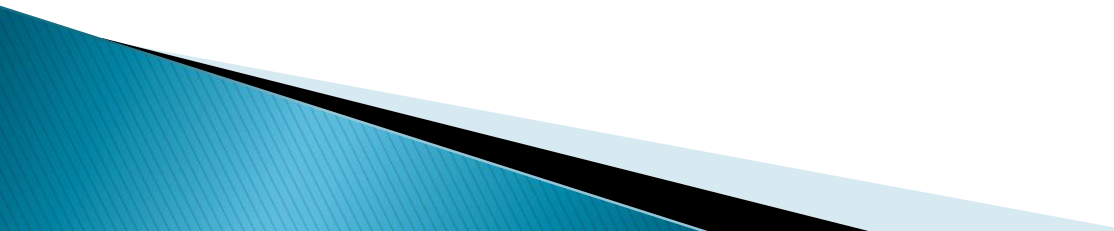
How can this code be made to be reentrant?

System Call

- ▶ Request to OS
 - ▶ Blocking
 - ▶ Nonblocking
- 

Interrupt

- ▶ Interrupt handler
 - ▶ Hardware or software

 - ▶ Signal
- 

Buffer Overflow

A	A	A	A	A	A	A	A	B	B
0	0	0	0	0	0	0	0	0	3

A	A	A	A	A	A	A	A	B	B
'e'	'x'	'c'	'e'	's'	's'	'i'	'v'	'e'	0