CSC552 – Advanced UNIX Programming

Introduction

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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

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 μs)	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?

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 reentrent?

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