

# 15-213

*“The course that gives CMU its Zip!”*

## Machine-Level Programming IV: Data

Sept. 20, 2006

### Structured Data

- Arrays
- Structs
- Unions

### Data/Control

- Buffer overflow

# Basic Data Types

## Integral

- Stored & operated on in general registers
- Signed vs. unsigned depends on instructions used

Intel	GAS	Bytes	C
byte	b	1	[unsigned] char
word	w	2	[unsigned] short
double word	l	4	[unsigned] int
quad word	q	8	[unsigned] long int (x86-64)

## Floating Point

- Stored & operated on in floating point registers

Intel	GAS	Bytes	C
Single	s	4	float
Double	l	8	double
Extended	t	10/12/16	long double

# Array Allocation

## Basic Principle

`T A[L];`

- Array of data type  $T$  and length  $L$
- Contiguously allocated region of  $L * \text{sizeof}(T)$  bytes

