Functions and Pointers Examples

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These slides provide examples of pointers in functions

Functions and Pointers Examples

- ## Function Example 1
  - ### Swap 2 values – not possible with only 1 return value

```
int main(void)
    int a;
    int b;
    …
    swap(&a, &b);
    return 0;
}

void swap(int * x, int * y){
    int tmp;
    tmp = *x;
    *x = *y;
    *y = tmp;
    return;
}
```

let a = 5 at memory location 0x1000
let b = 8 at memory location 0x1004

swap(address of a, address of b) = swap(0x1000, 0x1004)

tmp = ?
tmp = value pointed to by 0x1000 (5)
value pointed to by 0x1000 = value pointed to by 0x1004 (8)
value pointed to by 0x1004 = tmp (5)

a is now 8
b is now 5

tmp	? → 5	0x1014
y	0x1004	0x1010
x	0x1000	0x100C
		0x1008
b	8 → 5	0x1004
a	5 → 8	0x1000

Functions and Pointers Examples

- Function Example 2
  - Provide the quotient and remainder of a division

```
void divide(int num, int den, int * quo, int * rem);

int main(void){
    int numerator;
    int denominator;
    int quotient;
    int remainder;
…
    divide(numerator, denominator, &quotient, &remainder);
    return 0;
}

void divide(int num, int den, int * quo, int * rem){
    *quo = num / den;
    *rem = num % den;
    return;
}
```

Functions and Pointers Examples

- Reflection
  - Finally, we can understand our scanf() function
    - Reads in 1 or more values and stores them in variables
      - Cannot rely on a single return value

      ```
      int foo;
      float boo;
      scanf("%i, %f", &foo, &boo);
      ```

      scanf is very sophisticated but we can see that:

      to allow more than 1 thing to be read (modified) at a time
      scanf expects POINTERS for the variables passed in it's parameter list!!!