

C

SWE110

Lesson 5

Prof. Zachi Baharav

zbaharav@cogswell.edu

Lesson 5

- In previous lesson:
 - Program control
- **In this lesson:**
 - Functions
 - Introduction
 - Random()
- Next Lesson:
 - Scope , Debugging!!
 - printf, breakpoints, step, #ifdef
 - Command line running
- Homework 4
- Lab

How I see math word problems:



**If you have 4 pencils and I
have 7 apples, how many
pancakes will fit on the roof?
Purple, because aliens don't
wear hats.**

Functions

What type does
the function returns?

Function name

Inputs to this function

```
int main (void)
```

```
{
```

Function body

```
...function code..
```

```
return(0);
```

```
}
```

Functions (cont.)

Function **Declaration**
(aka prototype)

```
int sum (int a, int b);
```

```
int sum (int a, int b)  
{  
    return (a+b);  
}
```

Function **Definition**

```
int main (void)  
{  
    int a=3, b=8;  
    int sumAB ;  
  
    sumAB = sum( a,b );  
    .. More code...  
}
```

Functions (cont.)

Function **Declaration**

In **declaration**, no need to know exact name binding. Just types!!

```
int sum (int , int );
```

```
int sum (int a, int b)  
{  
    return (a+b);  
}
```

```
int main (void)  
{  
    int a=3, b=8;  
    int sumAB ;  
  
    sumAB = sum( a,b );  
    .. More code...  
}
```

Function **Definition**

Pass by value

```
void TimesTwo (int );
```


```
void TimesTwo (int a )  
{  
    a = 2*a ;  
}
```

```
int main (void)  
{  
    int a=3;  
    int b;  
  
    b = TimesTwo(a) ;  
    printf("TimesTwo(%d) = %d",a,b);  
  
    return(0);  
}
```

Pass by value

Prints:
TimesTwo(3) = 3

```
void TimesTwo (int );  
  
void TimesTwo (int a )  
{  
    a = 2*a ;  
}  
  
int main (void)  
{  
    int a=3;  
  
    printf("TimesTwo(%d) =",a);  
    TimesTwo(a) ;  
    printf("%d",a);  
  
    return(0);  
}
```



Pass by value

Remedy one:
Return a value!

Remedy two and
three (later on):

- Pass real address
- Arrays

```
int TimesTwo (int );
```

```
int TimesTwo (int a )  
{  
    return (2*a) ;  
}
```

```
int main (void)  
{  
    int a=3;  
    int b;  
  
    printf("TimesTwo(%d) =",a);  
    b = TimesTwo(a) ;  
    printf("%d",b);  
  
    return(0);  
}
```

Pass by value

Shorter way...

```
int TimesTwo (int );
```

```
int TimesTwo (int a )  
{  
    return (2*a) ;  
}
```

```
int main (void)  
{  
    int a=3;  
  
    printf("TimesTwo(%d) =",a);  
  
    printf("%d", TimesTwo(a));  
  
    return(0);  
}
```

Random number

```
#include <stdlib.h>

main()
{
    int r = rand();
}
```

- `rand()` is defined in `<stdlib.h>`
- Returns value between 0 and `RAND_MAX`.
- Use `%` operator to confine to a range:

```
int r = rand() % 20; // Random int between 0 and 19
```

Random number

```
#include <stdlib.h>
#include <time.h>

main()
{
    srand(time(NULL));
    int r = rand();
}
```

Random number: specific range

```
int low=3, high=7 ;
```

```
( rand() % (high-low+1) ) +low
```

Time to program!!

...

END