ICT 5101

Lecture 7

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Functions

- A function provides a convenient way to encapsulate some computation
  - it can then be used without worrying about its implementation.
- With properly designed functions, it is possible to ignore how a job is done; knowing what is done is sufficient.
- Example:
  - printf, scanf
- A function name generally starts with a verb

Function Definition

- A function definition has this form:

```
return-type function-name(parameter declarations, if any)
{
   declarations
   statements
}
```

Example

```
#include <stdio.h>
int power(int m, int n); // forward declaration
/* test power function */
    int main() {
    int i;
    for (i = 0; i < 10; ++i)
            printf("%d %d %d\n", i, power(2,i), power(-3,i));
    return 0;
}
/* power: raise base to n-th power; n >= 0 */
int power(int base, int n){
    int i, p;
    p = 1;
    for (i = 1; i <= n; ++i)
            p = p * base;
    return p;
}
```

Arguments - Call by Value

- In call by value, the called function is given the values of its arguments in temporary variables rather than the originals.
- Change in the argument doesn't affect the original variables
- Example
  - Function: int power(int base, int n)
  - If we call,

    x = power(b, num)

    change in base doesn't affect b.

Arguments - Call by Reference

- In call by reference, the called function is given the address of the original variables
- Change in the argument variable affect the original variables
- Example
  - Function: int power(int *base, int *n)
  - If we call,

    x = power(&b, &num)

    change in base will affect b because b and base is the same instance.

Arguments - Call by Reference

- If the argument is an array, then it is always passed as reference
- Example

```
int toUpper(char str[ ]) or int toUpper(char *str)
```

- Classic example of call by reference is swap function

Class Assignment

- Write a program named classassignment5.c
- The program should take a string (set of characters as input and save it in an array
- The program should have a function

  reverseString(char *inStr), which will take a string as input and reverses the string.
- The program should output the reversed string.
- Example:
  - Input = ICT5101
  - Output: 1015TCI