Functions

Functions

```
int main()
{
  double value1,
         value2;

  if (42.0 > 21.8)
  {
    value1 = 42.0;
  }
  else
  {
    value1 = 21.8;
  }
```

```
  if (value1 > 22.5)
    {
      value2 = value1;
    }
    else
    {
      value2 = 21.8;
    }

    cout << value1
         << " "
         << value2;

    return 0;
}
```


Functions

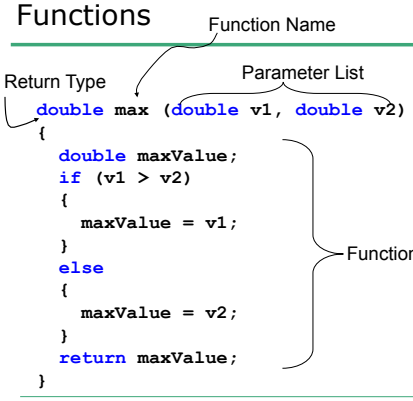
```
int main()
{
  double value1, value2;

  value1 = max(42.0, 21.8);
  value2 = max(value1, 22.5);

  cout << value1 << " " << value2;

  return 0;
}
```

Functions



Compiling Functions

- The *function prototype* must be given before the function is used

```
double max (double v1, double v2);

int main()
{

  double value1 = 4.2;
  cout << max(value1, 2.4);
  return 0;
}

double max (double v1, double v2)
{
  . . .
  return maxValue;
}
```


Functions

- "A collection of statements that perform a specific task", p 303
  - And can be accessed at any point in the code through a *function call* and optionally produce a value

Functions

- Functions are a way of building *modules* in your program
- Encapsulate some calculation
- Less repetitive code

Practice

- Write a function to calculate the factorial of a given integer.
- Remember: N! = n * (n-1) .... 2 * 1
- Write some C++ statements to use the function to print 4! to the screen

`void` Functions

- Not all functions need to produce a value

```
void printDayOfWeek (int day)
{
  if ( SUNDAY == day )
  {
    cout << " Sunday ";
  }
  else if (MONDAY == day )
  {
    cout << " Monday ";
  }
  . . .
  return; // no return value!
}
```

Practice

- Write a function that will calculate the average of three integers and print the result to the screen.
- What parameters do you need?
- What should the return type be?
- Write some C++ statements to call this function to determine the average of three integers given by the user.

Commenting a function declaration

```
/*****************************************************

Function:    max

Description: finds the maximum value of two doubles

Parameters:  value1 – a double, first of the pair
             value2 – a double, second of the pair

Returned:    the maximum of two values given

*****************************************************/

double max (double value1, double value2)
```


Practice

- Write a function that flips the case of a letter. When an upper case letter is given, return the lower case version. When a lower case letter is given, return the upper case version.
- If a punctuation or numeric character is given, just return that character.
- What parameters do you need?
- What should the return type be?

Passing Arguments

- Arguments are passed into functions
- Parameters are evaluated in the order given
- A **copy** of the argument is made in the parameter
- If a parameter is changed in the function, is that reflected in main?

What will happen?

```
void swap (int value, int value2)
{
  int tmp = value;
  value = value2;
  value2 = tmp;
  cout << value << " " << value2 << endl;
  return;
}

int main()
{
  int x = 9, y = 10;
  swap(x, y);
  cout << x << " --- " << y << endl;
  return 0;
}
```

parameters

arguments