
Functions

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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?

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What is the output?

```
void swap(int, int);

int main()
{
    int i, j;
    cin >> i >> j;
    swap(i, j);
    cout << i << " " << j;
    return 0;
}

void swap(int num1, int num2)
{
    int temp;
    temp = num1;
    num1 = num2;
    num2 = temp;
}
```

Arguments: arrow from `cin >> i >> j;` to `swap(i, j);`

Parameters: arrow from `swap(i, j);` to `void swap(int num1, int num2)`

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Passing Arguments

- What we have done so far is called passing by value
 - The arguments are copied into the parameter list
 - Any changes made to the parameters in the function will not be reflected in main
- Another way of passing variables is pass by reference
 - Any changes made in the function are reflected in the main

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Example

```
void swap(int &, int &);
int main(void)
{
    int i, j;
    cin >> i >> j;
    swap(i, j);
    cout << i << j;
    return 0;
}

void swap(int & num1, int & num2)
{
    int temp;
    temp = num1;
    num1 = num2;
    num2 = temp;
}
```

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Rules for Parameter Lists

- There must be the same number of arguments as there are parameters
- The correspondence between arguments and parameters is by position only
- Corresponding arguments and parameters must match in type
- The names of the arguments and parameters may be the same or different
- For reference parameters only, the parameter must be a single, simple variable

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Example

- Given the following function prototype:
`void checkIt(float &, float &, int, int, char &);`
- And declarations in main:
`float x, y;`
`int m;`
`char next;`
- 18.5 Which are legal?
- `checkIt(x, y, m+3, 10, next);`
- `checkIt(m, x, 30, 10, 'c');`
- `checkIt(x, y, m, 10);`
- `checkIt(35.0, y, m, 12, next);`
- `checkIt(x, y, m, m, c);`

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What is the output?

```
void changeIt (int, int&, int&);
void main()
{
    int i,j,k,l;
    i = 2;
    j = 3;
    k = 4;
    l = 5;
    changeIt(i, j, k);
    cout << i << j << k << endl;
    changeIt(k, l, i);
    cout << i << k << l << endl;
    changeIt(i, j, j);
    cout << i << j << endl;
    changeIt(i, i, i);
    cout << i << endl;
}

void changeIt(int a, int& b, int& c)
{
    a++;
    b += 2;
    c += a;
}
```

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What is the output?

```
void changeIt(int, int&, int&);
void main()
{
    int i, j, k, l;
    i = 2;
    j = 3;
    k = 4;
    l = 5;
    changeIt(i, j, k);
    cout << i << j << k << endl;
    changeIt(k, l, i);
    cout << i << k << l << endl;
}

void changeIt(int j, int& i, int& l)
{
    i++;
    j += 2;
    l += i;
}
```

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Program

- Write a function to compute the sum and average of two integers, and return the values of sum and average.
- An example function call would look like:
 - `compute (4, 5, sum, average);`
