MA122 - Computer Programming and Apllications

Indian Institute of Space Science and Technology

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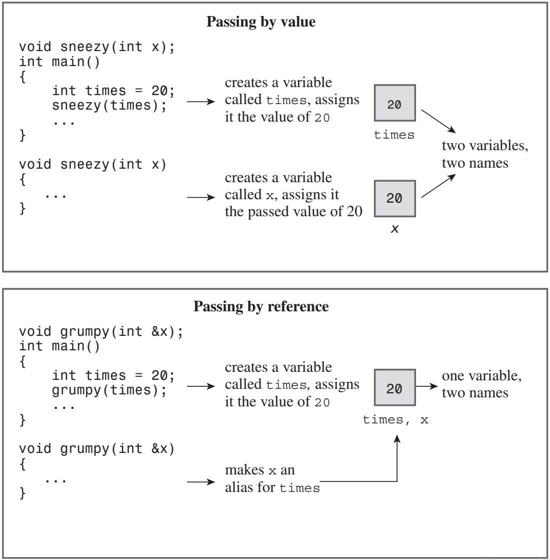
Lecture 19



Passing by value

```
void sneezy(int x);
int main()
{
    int times = 20;
    sneezy(times);
    ...
}

void sneezy(int x)
{
   ...
}
```

creates a variable called times, assigns it the value of 20

creates a variable called x, assigns it the passed value of 20

two variables, two names

Passing by reference

```
void grumpy(int &x);
int main()
{
    int times = 20;
    grumpy(times);
    ...
}

void grumpy(int &x)
{
   ...
}
```

creates a variable called times, assigns it the value of 20

makes x an alias for times

one variable, two names

Figure 8.8: Passing by value and passing by reference

example

```
#include <iostream>
void swapr(int & a, int & b); // a, b are aliases
void swapp(int * p, int * q); // p, q are addresses
void swapv(int a, int b);    // a, b are new variables
int main()
{
  using namespace std;
  int wallet1 = 300;
  int wallet2 = 350;

  cout << "wallet1 = $" << wallet1;
  cout << " wallet2 = $" << wallet2 << endl;

  cout << "Using references to swap contents:\n";
  swapr(wallet1, wallet2);
  cout << "wallet1 = $" << wallet1;
  cout << " wallet2 = $"<< wallet2 << endl;
```

example

```
  cout << "Using pointers to swap contents again:\n";
  swapp(&wallet1, &wallet2);

  cout << "wallet1 = $" << wallet1;
  cout << " wallet2 = $" << wallet2 << endl;
  cout << "Trying to use passing by value:\n";

  swapv(wallet1, wallet2);
  cout << "wallet1 = $" << wallet1;
  cout << " wallet2 = $" << wallet2 << endl;
  return 0;
}
void swapr(int & a, int & b) // use references
{
  int temp;
  temp = a;     // use a, b for values of variables
  a = b;
  b = temp; }
```

example

```c
void swapp(int *p, int * q)
{
  int temp;
  temp = *p;
  *p = *q;
  *q = temp;
}
void swapv(int a, int b)
{
  int temp;
  temp = a;
  a = b;
  b = temp;
}
```

Regular and reference arguments

```
#include <iostream>
double cube(double a);
double refcube(double &ra);
int main ()
{
  using namespace std;
  double x = 3.0;

  cout << cube(x);
  cout << " = cube of " << x << endl;

  cout << refcube(x);
  cout << " = cube of " << x << endl;
  return 0;
}
```

Regular and reference arguments

```
double cube(double a)
{
  a *= a * a;
  return a;
}
double refcube(double &ra)
{
  ra *= ra * ra;
  return ra;
}
```