~kvollmay/classes.dir/capstone_s2009.dir/unix_C++_intro.dir/inout.cc

```
//  Sample Program For Input/Output
//    with cout/cin name & birthdate are read in & sentence printed out
//    handling files: from file "birthdays.data" four name&birthdays read
//                    sentence for each printed into file "birthdaysout"
//
#include <iostream>   // for input/output via screen
using namespace std;
#include <fstream>    // for input/output via files
#include <string>     // to enable data-type string

int main(){
    int birthday, birthmonth,birthyear;
    string firstname,lastname;

// use screen for input and output:
//---------------------------------
    cout << "Please type your first name and your last name,"
         << " separated by a blank. ";
    cin >> firstname >> lastname;
    cout << "please type in your birthday (month, day, year) "
         << " in the form of three integers separated by blanks. ";
    cin >> birthmonth >> birthday >> birthyear;
    cout << firstname << " " << lastname << " is born on "
         << birthmonth << "/" << birthday << "/" << birthyear << "."
         << endl;

// use files for input and output:  (same as before but 4 times)
//-------------------------------------------------------------
// before you run this program cp birthdays.data which is in
// ~kvollmay/sunhome/classes.dir/capstone_s2009.dir/unix_C++_intro.dir/
    ifstream infile ("birthdays.data",ios::in);
    ofstream outfile ("birthdaysout",ios::out);
    int i;

    for (i=1; i <= 4; i++){
      infile >> firstname >> lastname;
      infile >> birthmonth >> birthday >> birthyear;
      outfile << firstname << " " << lastname << " is born on "
         << birthmonth << "/" << birthday << "/" << birthyear << "."
         << endl;
    }

    return 0;
   }
```

~kvollmay/classes.dir/capstone_s2009.dir/unix_C++_intro.dir/datatypes.cc

```
//  Sample Program For Data Types
//
#include <iostream>       // for cin  and cout
using namespace std;
#include <string>         // for string
#include <cmath>          // for mathematical functions
#include <cstdlib>        //  -"-

int main(){
// integer variables:
//--------------------
    int i1,i2;  //similarly short etc.

    i1 = 3;
    i2 = 4*i1;
    cout << "i1 = 3 and i2=4*i1= " << i2 << endl;

// real variables:
//---------------------

    double d1,d2,d3;  //similarly  float  and   long double

    d1 = 3.2;
    d2 = 2.1E-2;
    d3 = 1.5e+3;
    cout << "d1,d2,d3 = " << d1 << " " << d2 << " "<< d3 << endl;
    cout << "exp(3.1)= " << exp(3.1) << endl;

// character variables:
//----------------------

    char c1,c2,c3;                          // single characters
    string firstname,lastname,genericname;  // string of characters

    c1 = 'h';
    cout << "the character c1 = " << c1 << endl;
    cout << "please type in your first and last name " ;
    cin >> firstname >> lastname;
    cout << "Thank you " << firstname << " " << lastname << "!" << endl;
    genericname = "Otto Mueller";
    cout << genericname << endl;

// logical variable:
//---------------------

    bool  b1,b2,b3;

    b1 = false;
    b2 = true;
    b3 = (d1 < d2);
    cout << "b1, b2, b3 = " << b1 << " " << b2 << " " << b3 << endl;


    return 0;
   }
```

~kvollmay/classes.dir/capstone_s2009.dir/unix_C++_intro.dir/repetitions.cc

```
//  Sample Program For Repetitions
//   example reads in integer N and calculates&prints 1+2+3+...+N
//   using various repetition options and at end mathematical check
//
#include <iostream>       // for cin  and cout
using namespace std;
#include <cmath>          // for mathematical functions
#include <cstdlib>        //  -"-

int main(){
    int i,N,sum,check;

// read in N
    cout << "Please type in an integer. ";
    cin >> N;

// calculate 1+2+3+...+N

// while
```

```
    sum = 0;
    i = 0;
    while (i <= N){
        sum += i;
        i ++;
    }
    cout << "With while : 1+2+...+N = " << sum << endl;

// for

    sum = 0;
    for (i=0; i <= N; i++)
        sum += i;
    cout << "With for : 1+2+...+N = " << sum << endl;

// do while

    i = 0;
    sum = 0;
    do{
        sum += i;
        i++;
    }
    while (i <= N);
    cout << "With do-while : 1+2+...+N = " << sum << endl;;

// check with N*(N+1)/2

    check = (N*(N+1))/2;
    cout << "N*(N+1)/2= " << check << endl;


    return 0;
   }
```

~kvollmay/classes.dir/capstone_s2009.dir/unix_C++_intro.dir/decisions.cc

```
//  Sample Program For Decisions
//    This program reads in two names and birth dates and
//    prints out who the older person is.
//
#include <iostream>       // for cin  and cout
using namespace std;
#include <string>         // for string

int main(){
// read in names and birth dates
//--------------------------------
    string name1,name2;
    int day1,month1,year1,day2,month2,year2;

    cout << "Please type in the first name ";
    cin >> name1;
    cout << "What is the birth date of " << name1 << "? "
         << " (month, day, year)" << endl
         << "3 integers separated by blanks ";
    cin >> month1 >> day1 >> year1;

    cout << "Please type in the second name ";
    cin >> name2;
    cout << "What is the birth date of " << name2 << "? "
         << " (month, day, year) " << endl
         << "3 integers separated by blanks ";
    cin >> month2 >> day2 >> year2;

// determine who the older person is (older = 1 or 2, 3 if same)
//--------------------------------------------------------------

    int older;

    if(year1 != year2){
        if(year1 < year2)
            older = 1;
        else
            older = 2;
    }
    else if (month1 != month2){
        if(month1 < month2)
            older = 1;
        else
            older = 2;
    }
    else {
        if(day1 < day2)
            older = 1;
        else if (day1 > day2)
            older = 2;
        else
            older = 3;
    }

// print out the result
//-------------------------
    switch (older){
    case 1 :
        cout << name1 << " is the older person." << endl;
        break;

    case 2 :
        cout << name2 << " is the older person." << endl;
        break;

    case 3 :
        cout << name1 << " and " << name2 << " are the same age." << endl;
        break;
    }


    return 0;
   }
```

~kvollmay/classes.dir/capstone_s2009.dir/unix_C++_intro.dir/functions.cc

```
//  Sample Program For Functions
//
#include <iostream>       // for cin  and cout
using namespace std;
#include <string>         // for string
#include <cmath>          // for mathematical functions
#include <cstdlib>        //  -"-

double feetinchtometer (int,double);
void metertofeetinch (double, int&, double&);

int main(){
  int feetval;
```

```
  double inchval,resultmeter,meterin;

// Use of feetinchtometer

  cout << "Give the length in feet and inches "
       << "(feet as integer, inch as double "
       << "separated by blank)" << endl;
  cin >> feetval >> inchval ;

  resultmeter = feetinchtometer(feetval,inchval);
  cout << feetval << " feet and " << inchval << " inch = "
       << resultmeter << " m" << endl;

// Use of metertoinch

  cout << "Give the length in meter (one double)" << endl;
  cin >> meterin;
  metertofeetinch (meterin, feetval, inchval);
  cout << meterin << " m = "
       << feetval << " feet and " << inchval << " inch" << endl;
 return 0;
}
//--------------------------------------------------
// function converts feet + inch  to meter
//--------------------------------------------------
double feetinchtometer (int feet, double inch){

  double result;

  result = feet * 0.3048 + inch * 0.0254;
  return result;
}
//--------------------------------------------------
// function converts meter to feet + inch
//--------------------------------------------------
void metertofeetinch (double m, int& feet, double& inch){

    double remainingmeters;

    feet = int(m/0.3048);
    remainingmeters = fmod(m,0.3048);
    inch =  remainingmeters/0.0254;
}

~kvollmay/classes.dir/capstone_s2009.dir/unix_C++_intro.dir/arrays.cc
==========================================================================


//  Sample Program For Arrays and how to use in functions
//      A[]   B[][]
//
#include <iostream>       // for cin  and cout
using namespace std;
#include <string>         // for string
#include <cmath>          // for mathematical functions
#include <cstdlib>        //  -"-

const int ALENGTH = 5;
const int BLENGTH = 3;

void printvector (const int [], int);  // prints vector
void printmatrix (const int [BLENGTH][BLENGTH]);  //print BLENGTHxBLENGTH
void multiplyvectorbytwo (int [],int); // (modify vector)
void multiplymatrixbytwo (int [BLENGTH][BLENGTH]); // (modify matrix)

int main(){
    int A[ALENGTH];
    int B[BLENGTH][BLENGTH];
    int i,j,count;

// determine A and B
//
    for (i=0; i<= (ALENGTH-1); i++){
        A[i] = (i+1)*(i+1);
    }

    count = 0;
    for (i=0; i <= (BLENGTH-1); i++){
      for (j=0; j <= (BLENGTH-1); j++){
          B[i][j] = count;
          count++;
      }
    }

// print A
    cout << "A:  ";
    printvector(A,ALENGTH);   //call function to print A
    cout << endl;

// print B
    cout << "B: " << endl;
    printmatrix(B);

// multiply A by 2  and print again
    multiplyvectorbytwo(A,ALENGTH);
    cout << "A:  ";
    printvector(A,ALENGTH);   //call function to print A
    cout << endl;
// multiply B by 2 and print again
    multiplymatrixbytwo(B);
    cout << "B: " << endl;
    printmatrix(B);

return 0;
}

//--------------------------------------------------------------
// function prints vector   (example for 1-d array in, nothing out
void printvector(const int vectorA[], int Asize){
// alternative  void printvector(const int* vectorA, int Asize){
//--------------------------------------------------------------
   for (int i=0; i<= (Asize-1); i++){
        cout << vectorA[i] << " ";
    }
    cout << endl;
}
//--------------------------------------------------------------
// function prints matrix. notice that length needs to be specified
void printmatrix (const int matrix [BLENGTH][BLENGTH]){  //print matrix
//--------------------------------------------------------------
    for (int i=0; i <= (BLENGTH-1); i++){
      for (int j=0; j <= (BLENGTH-1); j++){
          cout << matrix[i][j]  << "  ";
      }
      cout << endl;
    }
    cout << endl;
}
```

```
//---------------------------------------------------------------
void multiplyvectorbytwo (int vector[], int size){
    for (int i=0; i<= (size-1); i++){
        vector[i] = vector[i]*2;
    }
}
//---------------------------------------------------------------
void multiplymatrixbytwo (int matrix [BLENGTH][BLENGTH]){
    for (int i=0; i <= (BLENGTH-1); i++){
      for (int j=0; j <= (BLENGTH-1); j++){
          matrix[i][j] = matrix[i][j] * 2;
      }
    }
}
//---------------------------------------------------------------
Note for KVL: make psfile with enscript -2r -p psfilename textfilename
```