```
/*
```

```
                    Nestor Gomez
                        Carnegie Mellon University
                    Engr Compu, 24-780B
                    PS01.  Due Tues. Sept. 7, 2021

                    Use Haversine formula to calculate
                    distance between to given coords
                    (latitude and longitude)

*/

#include <iostream>
//#include <stdio.h>

using namespace std;

double greatCircleDist(double lat1, double long1, double lat2, double long2)
{
	// using Haversine formula to determine distance between two
coordinates
	// on Earth's surface. Coords given in degrees.

	double earthsRadius = 6371;  // kilometers

	// convert angles to radians
	lat1 *= atan(1.) / 45.;
	long1 *= atan(1.) / 45.;
	lat2 *= atan(1.) / 45.;
	long2 *= atan(1.) / 45.;

	double sinLat = sin((lat2 - lat1) / 2.);
	double sinLong = sin((long2 - long1) / 2.);

	double a = sinLat * sinLat + cos(lat1) * cos(lat2) * sinLong * sinLong;
	double c = 2 * atan2(sqrt(a), sqrt(1 - a));
	return earthsRadius * c;
}

int main()
{
	double lat1, long1, lat2, long2;
	cout << "24 - 780B Engineering Computation Prob Set 1  Distance
Calculator" << endl;
```

```
	cout << "   Enter latitude  of point 1 > ";
	cin >> lat1; // 40.4433
	cout << "   Enter longitude of point 1 > ";
	cin >> long1; // -79.9512
	cout << "   Enter latitude  of point 2 > ";
	cin >> lat2; // 40.7651
	cout << "   Enter longitude of point 2 > ";
	cin >> long2; // -73.9801

	cout << endl;
	cout << "Distance is >> " << greatCircleDist(lat1, long1, lat2, long2)
		<< " km" << endl << endl;

	// not needed since pause does it all
	// cout << "Press the ENTER key to close the program > ";

	system("pause");
	return 0;
}
```