#include "pch.h"

#include <iostream>

#include <cmath>

#include <vector>

#include <iomanip>

#include <string>

using namespace std;

long long From10To2(int a) { //перевод из 10й в 2ю

int c, e;

double d;// так как Д может быть довольно большим

c = 2;

e = 1;

vector <int> num1;

while ((c != 0) && (c != 1)) {

c = a / 2;

d = a % 2;

num1.push\_back(d);

a = c;

e = e + 1;

}

num1.push\_back(c);//получаем массив в виде двоичного числа наоборот

d = 0;

for (int i = 0; i < e; i++) {//переводим массив в число

d = d \* 10;

d = num1[e - i -1] + d;

}

return(d);

}

int From2To10(long long a) {

int c, e, d;

e = 0;

d = 0;

while (a / 10 != 0) {

c = a % 10;

a = (a - c) / 10;

d = d + c \* pow(2, e);

e = e + 1;

}

d = d + (a % 10) \* pow(2, e);

return (d);

}

long long From8To2(int a) {

double d;

int c, e, f;

e = 0;

vector <int> num;

while (a != 0) {

c = a % 10;

for (int i = 0; i < 3; i++) {

d = c % 2;

c = c / 2;

num.push\_back(d);

}

c = a % 10;

a = (a - c) / 10;

e = e + 3;

}

d = 0;

for (int i = 0; i < e; i++) {

d = d \* 10;

d = num[e - i - 1] + d;

}

return(d);

}

int From2To8(long long a) {

int c, e, d, f;

e = 0;

f = 0;

while (a != 0) {

c = a % 1000;

d = 0;

for (int i = 0; i < 3; i++) {

d = d + (c % 10) \* pow(2, i);

c = (c - c % 10) / 10;

}

f = f + d \* pow(10, e);

e = e + 1;

a = (a - a % 1000) / 1000;

}

return (f);

}

long long From16To2(string a) {

char c;

unsigned long long d;

int e, f, g;

e = 0;

vector <int> num2;

for (int i = 0; i < size(a); i++) {

c = a[size(a) - i - 1];

if ((int(c) >= 65) && (int(c) <= 70)) {

g = int(c) - 55;

for (int i = 0; i < 4; i++) {

f = g % 2;

g = g / 2;

num2.push\_back(f);

}

}else if ((int(c) >= 48) && (int(c) <= 57)) {

g = int(c) - 48;

for (int i = 0; i < 4; i++) {

f = g % 2;

g = g / 2;

num2.push\_back(f);

}

}else {

cout << "bad number input error" << endl;

return 0;

}

e = e + 4;

}

d = 0;

for (int i = 0; i < e; i++) {

d = d \* 10;

d = num2[e - i - 1] + d;

}

return(d);

}

string From2To16(long long a) {

string s = "";

string s1 = "";

char k;

int c, e, d, f;

e = 0;

f = 0;

while (a != 0) {

c = a % 10000;

d = 0;

for (int i = 0; i < 4; i++) {

d = d + (c % 10) \* pow(2, i);

c = (c - c % 10) / 10;

}

if ((d >= 0) && (d <= 9)) {

k = char(d + 48);

}

else {

k = char(d + 55);

}

s = s + k;

a = (a - a % 10000) / 10000;

}

for (int i = 0; i < size(s); i++) {

s1 = s1 + s[size(s) - i - 1];

}

return (s1);

}

int main()

{

double a;

string command;

cout << " <1> means converting from 10 system to 2 system" << endl;

cout << " <2> means converting from 2 system to 10 system" << endl;

cout << " <3> means converting from 8 system to 2 system" << endl;

cout << " <4> means converting from 2 system to 8 system" << endl;

cout << " <5> means converting from 10 system to 8 system" << endl;

cout << " <6> means converting from 8 system to 10 system" << endl;

cout << " <7> means converting from 2 system to 16 system" << endl;

cout << " <8> means converting from 16 system to 2 system" << endl;

cout << "Choose your destiny: ";

getline(cin, command);

if (command == "8") {

string m;

cout << "and then input your number ";

cin >> m;

cout << From16To2(m);

return 0;

}

cout << "and then input your number ";

cin >> a;//делаем все через функции для большей наглядности

if (a - trunc(a) > 0) {

cout << "error please input integer number";

return 0;

}else if (a < 0) {

cout << "error please input positive number";

return 0;

}

if (command == "1") {

a = From10To2(a);

}else if (command == "2") {

a = From2To10(a);

}else if (command == "3") {

a = From8To2(a);

}else if (command == "4") {

a = From2To8(a);

}else if (command == "5") {

a = From10To2(a);

a = From2To8(a);

}else if (command == "6") {

a = From8To2(a);

a = From2To10(a);

}

else if (command == "7") {

cout << From2To16(a);

return 0;

}else {

cout << "bad command input error";

}

cout << "The result is " << a;

return 0;

}