**Subject: PRF192- PFC**

**Workshop 03**

Tiếp thu 90%, điểm slot 14/2: 8đ; ý kiến:…..

**Objectives:**

1. Practicing skills at analyzing and implementing programs using user-defined functions.
2. Making familiar with some basic algorithms

**Grading** **10 programs, 1 mark/program**

**Program 1:**

/\*

Name: Tran Nguyen Quoc Cuong

Date: 2022/02/14

De: Write a C that will accept a positive integer n, n>=2 then print out primes between 2 and n.

\*/

#include <stdio.h>

#include <math.h>

int prime(int n) {

int m = sqrt(n);

int result = 1;

for (int i = 2; i <= m; i++)

if (n % i == 0) result = 0;

return result;

}

int main() {

int n;

while (n < 2) {

printf("Input n: ");

scanf("%d", &n);

}

printf("Primes between 2 and %d: ", n);

for (int j = 2; j <= n; j++)

if (prime(j) == 1)

printf("%d ", j);

return 0;

}

**Program 2:**

/\*

Name: Tran Nguyen Quoc Cuong

Date: 2022/02/14

De: Write a C program that will accept data of a day then print out whether they are valid or not.

\*/

#include <stdio.h>

int validDate (int d, int m, int y) {

int maxd = 31;

if (d < 1 || d > 31 || m < 1 || m > 12) return 0;

if (m == 4 || m == 6 || m == 9 || m == 11) maxd = 30;

else if (m == 2) {

if ((y % 400 == 0) || ((y % 4 == 0) && (y % 100 != 0))) maxd = 29;

else maxd = 28;

}

return maxd;

}

int main() {

int d, m, y;

printf("Input date: ");

scanf("%d", &d);

printf("Input month: ");

scanf("%d", &m);

printf("Input year: ");

scanf("%d", &y);

if (validDate(d, m, y) >= d) printf("Valid date");

else printf("Invalid date");

return 0;

}

**Program 3:**

/\*

Name: Tran Nguyen Quoc Cuong

Date: 2022/02/14

De: Write a C program that will accept a point and a circle having the center is (0,0)

then print out the relative position of this point with the circle.

\*/

#include <stdio.h>

int getRelPos (double r, double x, double y) {

double d2 = x \* x + y \* y;

double r2 = r \* r;

int result;

if (d2 < r2) result = 1;

else if (d2 == r2) result = 0;

else result = -1;

return result;

}

int main() {

double r, x, y;

printf("Input x, y: ");

scanf("%lf%lf", &x, &y);

do {

printf("Input r: ");

scanf("%lf", &r);

} while (r < 0);

if (getRelPos(r, x, y) == 1) printf("The point is in the circle");

else if (getRelPos(r, x, y) == 0) printf("The point is on the circle");

else printf("The point is out of the circle");

return 0;

}

**Program 4:**

/\*

Name: Tran Nguyen Quoc Cuong

Date: 2022/02/14

De: Write a C program that will accept a positive integer then print out its factorial.

\*/

#include <stdio.h>

long factorial(int n) {

long p = 1;

for (int i = 1; i <= n; i++) p \*= i;

return p;

}

int main() {

int n;

do {

printf("Input n: ");

scanf("%d", &n);

} while (n < 1);

printf("Factorial of %d: %ld", n, factorial(n));

return 0;

}

**Program 5:**

/\*

Name: Tran Nguyen Quoc Cuong

Date: 2022/02/14

De: Write a C program that will print out the value at the nth position in Fibonacci sequence.

\*/

#include <stdio.h>

long fibo (int n) {

int t1 = 1;

int t2 = 1;

int f = 1;

int i;

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

f = t1 + t2;

t1 = t2;

t2 = f;

}

return f;

}

int main() {

int n;

do {

printf("Input nth position: ");

scanf("%d", &n);

} while (n < 1);

printf("The value at the position number %d in Fibonacci sequence: %ld", n, fibo(n));

return 0;

}

**Program 6:**

/\*

Name: Tran Nguyen Quoc Cuong

Date: 2022/02/14

De: Write a C program that will accept a positive integer then print out whether it is an element of the Fibonacci sequence or not.

\*/

#include <stdio.h>

int fibo (int n) {

int t1=1;

int t2=1;

int f=1;

if (n==1) return 1;

while (f<n) {

f = t1 + t2;

t1 = t2;

t2 = f;

}

return n == f;

}

int main() {

int n;

do {

printf("Input n: ");

scanf("%d", &n);

} while (n < 1);

if (fibo(n) == 1) printf("%d is a Fibonacci element", n);

else printf("%d is not a Fibonacci element", n);

return 0;

}

**Program 7:**

/\*

Name: Tran Nguyen Quoc Cuong

Date: 2022/02/14

De: Write a C program that will carry out some times.

In each time, a nonnegative integer is accepted then print out the sum of its decimal digits.

The program will terminate when its value of accepted number is negative.

\*/

#include <stdio.h>

int sumDigits (int n) {

int sum = 0;

do {

int remainder = n % 10;

n = n / 10;

sum += remainder;

} while (n > 0);

return sum;

}

int main() {

int n;

do {

printf("Input n: ");

scanf("%d", &n);

if (n >= 0) printf("Sum of decimal digits: %d\n", sumDigits(n));

} while (n>=0);

return 0;

}

**Program 8:**

/\*

Name: Tran Nguyen Quoc Cuong

Date: 2022/02/14

De: Write a C program that will accept the integral part and fraction of a real number then print out the this real number.

\*/

#include <stdio.h>

double makeDouble(int ipart, double fraction) {

double real;

while (fraction >= 1) fraction = fraction / 10;

if (ipart < 0) real = ipart - fraction;

else real = ipart + fraction ;

return real;

}

int main() {

int ipart;

double fraction;

printf("Input integral part: ");

scanf("%d", &ipart);

do {

printf("Input fraction part: ");

scanf("%lf", &fraction);

} while (fraction < 0);

printf("The real number made from two part is: %lf", makeDouble(ipart, fraction));

return 0;

}

**Program 9:**

/\*

Name: Tran Nguyen Quoc Cuong

Date: 2022/02/14

De: Write a C program that will accept two positive integers then print out their greatest common divisor and least common multiple.

\*/

#include <stdio.h>

int gcd(int a, int b) {

while (a != b) {

if (a > b) a = a - b;

else b = b - a;

}

return a;

}

int lcm(int a, int b) {

return a \* b / gcd(a, b);

}

int main() {

int a, b;

do {

printf("Input a: ");

scanf("%d", &a);

printf("Input b: ");

scanf("%d", &b);

} while ((a <= 0) || (b <= 0));

printf("The greatest common divisor of %d and %d is: %d", a, b, gcd(a, b));

printf("\nThe least common multiple of %d and %d is: %d", a, b, lcm(a, b));

return 0;

}

**Program 10:**

/\*

Name: Tran Nguyen Quoc Cuong

Date: 2022/02/14

De: Write a C program that will accept a non-negative integer then print out its minimum and maximum digits.

\*/

#include <stdio.h>

void printMinMaxDigits (int n) {

int digit, min, max;

min = 9;

max = 0;

while (n > 0) {

digit = n % 10;

n = n / 10;

if (min > digit) min = digit;

if (max < digit) max = digit;

}

printf("Minimum digit: %d\n", min);

printf("Maximum digit: %d", max);

}

int main() {

int n;

do {

printf("Input n: ");

scanf("%d", &n);

printMinMaxDigits(n);

} while (n < 0);

return 0;

}