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#### ΜΕΤΑΠΤΥΧΙΑΚΟ ΔΙΠΛΩΜΑ ΕΙΔΙΚΕΥΣΗΣ

#### «ΠΛΗΡΟΦΟΡΙΑΚΑ ΣΥΣΤΗΜΑΤΑ»

#### ΘΕΜΑΤΙΚΗ ΕΝΟΤΗΤΑ

#### "ΒΑΣΙΚΕΣ ΕΞΕΙΔΙΚΕΥΣΕΙΣ ΣΕ ΘΕΩΡΙΑ ΚΑΙ ΛΟΓΙΣΜΙΚΟ" (ΠΛΣ50)

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#### ΓΡΑΠΤΗ ΕΡΓΑΣΙΑ 1η

#### Αθήνα

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**ΘΕΜΑ 1: ΑΠΛΗ ΑΡΙΘΜΟΜΗΧΑΝΗ**

#include <stdio.h>

int main()

{

// Define variables

double number1, number2;

char operator;

printf("Please enter a number, an arithmetic operator + - \* / and a number, separated by a space character. \n");

scanf("%lf %c %lf", &number1, &operator, &number2);

// Validate input

if (operator == '+') {

printf("Result = %lf \n", number1 + number2);

}

else if (operator == '-') {

printf("Result = %lf \n", number1 - number2);

}

else if (operator == '\*') {

printf("Result = %lf \n", number1 \* number2);

}

else if (operator == '/') {

if (number2 != 0) {

printf("Result = %lf \n", number1 / number2);

}

else {

printf("Division by zero is invalid. \n");

}

}

else {

printf("Not supported operator: %c \n", operator);

}

return(0);

}

**ΘΕΜΑ 2: ΓΕΩΜΕΤΡΙΚΟΙ ΥΠΟΛΟΓΙΣΜΟΙ**

#include <stdio.h>

#include <math.h>

// Define functions

double squarePerimeter(double size);

double parallelogramPerimeter(double length, double width);

double rightTrianglePerimeter(double vSizeLength, double othervSizeLength);

double circlePerimeter(double radius);

int main()

{

int option = -1;

// Exit in option 0

while (option != 0) {

printf("Perimeter calculator. Enter a shape option: \n");

printf("0 Exits the program \n");

printf("1 Square \n");

printf("2 Parallelogram \n");

printf("3 Right triangle \n");

printf("4 Circle \n");

scanf("%d", &option);

if (option == 1) {

// Square

printf("Enter the square size length: \n");

double squareSize;

scanf("%lf", &squareSize);

printf("Square perimeter = %lf \n\n", squarePerimeter(squareSize));

} else if (option == 2) {

// Parallelogram

printf("Enter the parallelogram's length and width size: \n");

double length, width;

scanf("%lf %lf", &length, &width);

printf("Parallelograms perimeter = %lf \n\n", parallelogramPerimeter(length, width));

} else if (option == 3) {

// Right triangle

printf("Enter the Right triangle's vertical sizes length: \n");

double length, width;

scanf("%lf %lf", &length, &width);

printf("Right triangles perimeter = %lf \n\n", rightTrianglePerimeter(length, width));

} else if (option == 4) {

// Circle

printf("Enter the Circle's radius: \n");

double radius;

scanf("%lf", &radius);

printf("Circles perimeter = %lf \n\n", circlePerimeter(radius));

} else if (option != 0){

printf("Invalid option: %d \n", option);

} else if (option == 0){

printf("Bye! \n");

}

}

return(0);

}

/\*

Calculates the perimeter

\*/

double squarePerimeter(double size) {

return 4 \* size;

}

double parallelogramPerimeter(double length, double width){

return (2 \* length) + (2 \* width);

}

double rightTrianglePerimeter(double vSizeLength, double othervSizeLength) {

return sqrt(pow(vSizeLength, 2) + pow(othervSizeLength, 2));

}

double circlePerimeter(double radius){

return 2 \* 3.141592 \* radius;

}

**ΘΕΜΑ 3: ΔΥΑΔΙΚΗ ΑΝΑΠΑΡΑΣΤΑΣΗ ΑΡΙΘΜΟΥ**

#include <stdio.h>

#include <math.h>

int main()

{

int number = -1;

const int BINARY = 2;

printf("Reverse binary representation. Enter a positive integer. \n");

printf("0 Exits the program \n");

// Exit in number 0

while (number != 0) {

scanf("%d", &number);

if (number > 0) {

while (number != 0) {

// Calculate the modulo 2

int remainder = number % BINARY;

// Print the remainder

(remainder == 1) ? putchar('1'): putchar('0');

number = number / 2;

}

}

else if (number == 0){

printf("Bye! \n");

} else {

printf("Invalid input. Enter a positive integer. \n");

}

}

return(0);

}

**ΘΕΜΑ 4: ΣΥΣΤΗΜΑ ΚΑΤΑΓΡΑΦΗΣ ΚΡΑΤΗΜΕΝΩΝ ΘΕΣΕΩΝ**