Exercise W5D4

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C Programming

In this report we will develop and analyse the code of 3 programs written in C++ to explore the basic functions of this language

TASKS

1. Write a C program that, given a real number D entered from the keyboard, calculates and prints:
   - The area of a square with side D
   - The area of a circle with diameter D
   - The area of an equilateral triangle with side D

2. Write a C program that allows you to enter a series of numbers from the keyboard (of your choice but minimum 3) and then calculate the arithmetic mean, printing the result both with 2 decimal places and without decimal places, thus rounding the result.

3. By combining the two exercises, both of the above-mentioned results will be used to present to the user:
   - The area of the square (using both the decimal value and the rounded value)
   - The area of the circle (using both the decimal value and the rounded value)
   - The area of the equilateral triangle (using both the decimal value and the rounded value)

EXERCISE 1

Code:

main.cpp

Share Run

```cpp
#include <iostream>
#include <math.h>

int main() {
    float a;
    float area_square;
    float area_circle;
    float area_triangle;
    printf("Insert a number:\n");
    scanf("%f",&a);
    area_square=a*a;
    area_circle=((a*a)*3.14)/4;
    area_triangle=(sqrt(3)/4)*(a*a);
    printf("The area of the square of side %g is: %g",a,area_square);
    printf("\nThe area of the circle of diameter %g is: %g",a,area_circle);
    printf("\nThe area of the triangle of side %g is: %f",a,area_triangle);
    return 0;
}
```

Output:

Output

```
Insert a number:
4
The area of the square of side 4 is: 16
The area of the circle of diameter 4 is: 12.56
The area of the triangle of side 4 is: 6.928203

=== Code Execution Successful ===
```

//comment//

To print the results, I used %g which is a versatile and practical format specifier in printf that allows numbers to be printed clearly and concisely, removing trailing zeros and automatically selecting the most appropriate format. Using it helps to keep the output clean and easily readable.

EXERCISE 2

Code:

main.cpp

Share Run

```cpp
#include <iostream>

int main() {
    float n1;
    float n2;
    float n3;
    printf ("This program calculates the average of 3 numbers.\n");
    printf ("Insert the first number: ");
    scanf ("%f",&n1);
    printf ("Insert the second number: ");
    scanf ("%f",&n2);
    printf ("Insert the third number: ");
    scanf ("%f",&n3);
    float avrg = (n1+n2+n3)/3;
    int round_avg = (int)(avrg + 0.5f);
    printf ("\n\nThe average of the numbers is: %.2f",avrg);
    printf ("\nThe average rounded is: %d",round_avg);

    return 0;
}
```

Output:

Output

```
This program calculates the average of 3 numbers.
Insert the first number: 7
Insert the second number: 9
Insert the third number: 25


The average of the numbers is: 13.67
The average rounded is: 14

=== Code Execution Successful ===
```

//comment//

To obtain the rounded value of the average, the *float* value was converted into an *int* by adding 0.5, to round it up.

To print the *float* value with only 2 digits after the decimal point, the format modifier %.2f was used.

EXERCISE 3

Code:

main.cpp

Share Run

```cpp
#include <iostream>
#include <math.h>

int main() {
    float a;
    float area_square;
    float area_circle;
    float area_triangle;
    printf("Insert a number:\n");
    scanf("%f",&a);
    area_square=a*a;
    area_circle=((a*a)*3.14)/4;
    area_triangle=(sqrt(3)/4)*(a*a);
    int r_area_square = (int)(area_square+0.5f);
    int r_area_circle = (int)(area_circle+0.5f);
    int r_area_triangle = (int)(area_triangle+0.5f);
    printf("The area of the square of side %g is: %.2f",a,area_square);
    printf("\nRounded: %d",r_area_square);
    printf("\nThe area of the circle of diameter %g is: %.2f",a,area_circle);
    printf("\nRounded: %d",r_area_circle);
    printf("\nThe area of the triangle of side %g is: %.2f",a,area_triangle);
    printf("\nRounded: %d",r_area_triangle);

    return 0;
}
```

Output:

Output

```
Insert a number:
2
The area of the square of side 2 is: 4.00
Rounded: 4
The area of the circle of diameter 2 is: 3.14
Rounded: 3
The area of the triangle of side 2 is: 1.73
Rounded: 2

=== Code Execution Successful ===
```