

Exercise 1 : Consider the following program:

```

1  #include <stdio.h>
2  #include <math.h>
3  int main() {
4  int x , y , b , c , z;      float Z , D;
5  printf("Give the values of x and y : ");
6  scanf ("%d%d", &x , &y);
7  getchar();
8  printf("(1) : %d%d \n", x, y);
9  printf("(2) : %d %d \n", x, y);
10 printf("(3) : x=%d y=%d \n", x, y);
11 getchar();
12 z=y+x/y;    Z=y+x/y;
13 printf("(4) : z=%d Z=%f \n", z, Z);
14 getchar();
15 printf("(5) : z=%f Z=%d \n", z, Z);
16 getchar();
17 c = 4;
18 D=sqrt(x);
19 b=pow((x-c), 2)-c;
20 Z=pow((x-c), 2)-c;
21 printf("(6) : D=%f b=%d Z=%f \n", D, b, Z);
22 getchar();
23 printf("(7) : D=%0.1f b=%6d Z=%5.0f \n", D, b, Z);
24 printf("(8) : D=%4.f b=%1d Z=%.2f \n", D, b, Z);
25 return(0); }
```

Note : `getchar()` ; is a function that reads a character; it is used here only to make breakpoints in the program execution.

1- Give the displays in lines **8, 9, 10** for the given values **x=9, y=18**.

(1) :

(2) :

(3) :

2- Give the display in line **13**

(4) :

3- Complete the following text :

The division operator `‘/’` gives the result of the quotient of division between two operands.

The result is of type integer if:

Otherwise, it is of type

Examples : $8/3 =$

$5.0/2 =$

$2/3 =$

(float) $2/3 =$

(int) $5.0/2 =$

The C language is case sensitive, so **z** and **Z** are two different.....

The decimal part of a real variable is displayed with digits.

4- Replace the instructions (in line **12**) :

$z=y+x/y;$ $Z=y+x/y;$

by :

$z=y+(float)x/y;$

$Z=y+(float)x/y;$

Then give the new display in line **13**

(4) :

5- Complete the following text:

(float) x/y forces the type of the value of x to be so the result becomes of type

Examples : (float) 3/5 =

(int) 5.5/2=

If an integer variable z receives a real value, then z takes.....

Examples : int z ; z=3.5 ; printf("z=%d", z) ; //displays : z=

6- Give the display in line 15.

(5) :

7- Complete the following text:

If a variable is of type integer, it must be displayed in the format ' ', and if it is of type float, it will be displayed in the format ' '. Not respecting the display format of a variable will result in

8- Give the mathematical expressions for variables **D** and **b** from lines **18, 19**.

D=..... b=.....

9- Give the display in line **21**

(6) :

10- Complete the following text :

sqrt(x) gives

pow(x , n) gives.....

Examples : sqrt(9)= $x^{\sqrt{c}}$ is written in C as follows :

11- Give the displays in lines **23, 24**.

(7) :

(8) :

12- Complete the following text :

Let Z be a float variable. If we want to display the value of Z on nb positions with nbd decimal digits, then we write: printf("Z=%f", Z);

Examples : Z=235.4918 ;

printf("Z=%6.0f", Z) ; //displays :	
printf("Z=%6.2f", Z) ; //displays :	
printf("Z=%10.3f", Z) ; //displays :	
printf("Z=%0.2f", Z) ; //displays :	
printf("Z=%2.1f", Z) ; //displays :	

Exercise 2 :

Consider the following program :

```

1 | #include <stdio.h>
2 | int main() {    short x , y, i, c;
3 | printf("5/c=%hd \n", 5/c);
4 | printf("Size(x)=%d,Size(short)=%d,Size(float)=%d,Size(int)=%d,Size(double)=%d,Size(char)=%d\n",
5 | sizeof(x), sizeof(short), sizeof(float), sizeof(int), sizeof(double), sizeof(char));    getchar();

```

```

6 | x=10;      y=50;
7 | i=x+y;    printf("i=%hd \n", i);
8 | getchar();
9 | x=18000;   y=19000;
10| i=x+y;    printf("i=%hd \n", i);
11| return(0); }

```

1) What does happen at the execution of the statement in line 3 and why?

.....

.....

2) Knowing that ‘**sizeof**’ function is used to determine the size in bytes of any data type or a variable, give the display in lines 4, 5.

3) According to the previous display, what is the range of possible values that can be represented with a variable of type: int, short, char?

..... ≤ **char** ≤

..... ≤ **short** ≤

..... ≤ **int** ≤

4) Complete the following text:

A variable that does not take a value is initialized by

Division by zero causes

5) Give the displays in line 7

6) See the output generated by the display in line 10. What can you say?

.....

.....

.....

.....

For each numeric type, there is a range of possible values, so this point must be taken into consideration and we must provide types with larger sizes if necessary.

Exercise 3 :

- Give output generated by this code.

Code	Output (display)
int i, y, z, c, b, x;	
i=3; y =8+i % 3; printf("y=%d\n", y);	
z =(8+i)%3; printf("z=%d\n", z);	
b =7!=2 -1>=-2 && 4<3; printf("b=%d\n", b);	
c =(7!=2 -1>=-2) && 4<3; printf("c=%d\n", c);	
x =y/4*2; printf("x=%d\n", x);	
y =1+i*4-5; printf("y=%d\n", y);	
y =(1+i)*4-5; printf("y=%d", y);	

Exercise 4 :

Write the following program :

```
1 | #include <stdio.h>
2 | int main() {
3 |     char C='A', c='a';          int n=47;
4 |     printf("The ASCII code of '%c' is : %d\n", C, C);
5 |     printf("The ASCII code of '%c' is : %d\n", c, c);
6 |     getchar();
7 |     C='S';      C++;
8 |     c='s';      c--;
9 |     printf("The ASCII code of '%c' is : %d\n", C, C);
10 |    printf("The ASCII code of '%c' is : %d\n", c, c);
11 |    return 0; }
```

1- Run your program to give the display in lines 4, 5.

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Note : Let *c* be character variable, if you want to display its value as character we use the format specifier '%c'. If you want to display its ASCII code we use the format specifier '%d'.

2- Run your program to give the display in lines 9, 10.

3- Complete the following texts :

In line 7 : C++; changes the value of C to its

In line 8 : c--; changes the value of c to its

When we add an integer value x to a character c, the result is the sum between

4- Give a '**printf**' statement allowing you to display the equivalent character to the value of n.

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Note : The value of n corresponds to the decimal ASCII code of the character '/'

5- Give two '**printf**' statements, allowing you to display the ASCII code of 'Z' in two different ways.

Exercise 5 :

A product is characterized by its unit price (UP) and quantity (Q). Write a program that:

1) Reads the unit price and quantity of the product.

2) Calculates the price without tax (PWT) and the total price of the product (TP), given that the tax is 17%.

3) Displays the result in the following format:

PWT=.....Dinars

TP=.... Dinars

Exercise 6 :

Consider the following algorithm:

algorithm ex6;

Variable a, b, c, d : integer;

Begin

print("Enter a and b : "); Read(a, b);

$a \leftarrow a+b$;

$b \leftarrow a-b$;

$a \leftarrow a-b$;

Print("a=", a, " b=", b);

print("Enter c and d : "); Read(c, d);

$d \leftarrow c*d$;

$c \leftarrow d/c$;

$d \leftarrow d/c$;

Print("c=", c, " d=", d);

End.

1) Translate this algorithm into a C program, then run it for:

a=1, b=7

2) What does this program do?

3) Run the program for **a=0, b=2**. What do you notice and why?

4) What type of error occurs here:

a) An error that occurs during compilation (compilation error)

b) An error that occurs during execution (runtime error)

5) Suggest another error of the same type.

Exercise 7 :

Write a program that decomposes a sum of money into : 200 dinar bills, 50 dinar coins, 20 dinars, 5 dinars and 1 dinar. The sum will be read from the keyboard, and the values displayed line by line.

Exercise 8 : (Homework)

Give the program which allows you to read a date given by an integer composed of 8 digits DDMMYYYY, then to decode this date into day, month and year.

Example: 27091993 ==> day: 27, month: 09, year: 1993