MINISTRY OF EDUCATION OF THE REPUBLIC OF BELARUS

EDUCATIONAL INSTITUTION

«BREST STATE TECHNICAL UNIVERSITY»

Department of IIT

Laboratory work №3

For the first semester

Topic: «C Data Types»

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**Laboratory work №3**

**C Data Types**

**Goal:** to get acquainted with the main types of С data. Understand the meaning of input and output commands.

**Equipment:** PC (Personal Computer)

**1.** Please dial the code of the program

**#include** <stdio.h>

**int** **main**(**void**)

{

**int** ten = 10;

**int** two = 2;

**printf**("Doing it right: ");

**printf**("%d minus %d is %d\n", ten, 2, ten - two );

**printf**("Doing it wrong: ");

**printf**("%d minus %d is %d\n", ten ); // forgot 2 arguments

**return** 0;

}

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**2.** Please dial the code of the program

**#include** <stdio.h>

**int** **main**(**void**)

{

**unsigned** **int** un = 3000000000; /\* system with 32-bit int \*/

**short** end = 200; /\* and 16-bit short \*/

**long** big = 65537;

**long** **long** verybig = 12345678908642;

**printf**("un = %u and not %d\n", un, un);

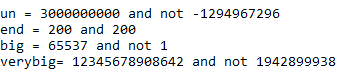
**printf**("end = %hd and %d\n", end, end);

**printf**("big = %ld and not %hd\n", big, big);

**printf**("verybig= %lld and not %ld\n", verybig, verybig);

**return** 0;

}



**3.** Please dial the code of the program

/\* showf\_pt.c -- displays float value in two ways \*/

**#include** <stdio.h>

**int** **main**(**void**)

{

**float** aboat = 32000.0;

**double** abet = 2.14e9;

**long** **double** dip = 5.32e-5;

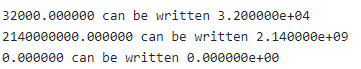
**printf**("%f can be written %e\n", aboat, aboat);

**printf**("%f can be written %e\n", abet, abet);

**printf**("%f can be written %e\n", dip, dip);

**return** 0;

}

  
**4.** Please dial the code of the program

**#include** <stdio.h>

**int** **main**(**void**)

{

**char** ch;

**printf**("Please enter a character.\n");

**scanf**("%c", &ch); /\* user inputs character \*/

**printf**("The code for %c is %d.\n", ch, ch);

**return** 0;

}

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**5.** Please dial the code of the program

**#include** <stdio.h>

**int** **main**(**void**)

{

**printf**("Type int has a size of %u bytes.\n", **sizeof**(**int**));

**printf**("Type char has a size of %u bytes.\n", **sizeof**(**char**));

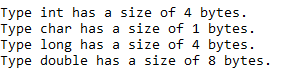
**printf**("Type long has a size of %u bytes.\n", **sizeof**(**long**));

**printf**("Type double has a size of %u bytes.\n",

**sizeof**(**double**));

**return** 0;

}



**6.** Once again, you begin with a sample program. As before, you'll find some unfamiliar wrinkles that we'll soon iron out for you. The program's general intent should be clear, so try compiling and running the source code shown in Listing 3.1. To save time, you can omit typing the comments.

**#include** <stdio.h>

**int** **main**(**void**)

{

**float** weight; /\* user weight \*/

**float** value; /\* rhodium equivalent \*/

**printf**("Are you worth your weight in rhodium?\n");

**printf**("Let's check it out.\n");

**printf**("Please enter your weight in pounds: ");

/\* get input from the user \*/

**scanf**("%f", &weight);

/\* assume rhodium is $770 per ounce \*/

/\* 14.5833 converts pounds avd. to ounces troy \*/

value = 770.0 \* weight \* 14.5833;

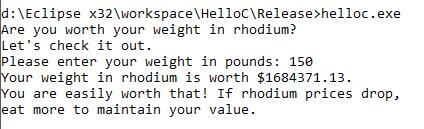
**printf**("Your weight in rhodium is worth $%.2f.\n", value);

**printf**("You are easily worth that! If rhodium prices drop,\n");

**printf**("eat more to maintain your value.\n");

**return** 0;

}



**7.** Let's run one more printing example, one that makes use of some of C's special escape sequences for characters. In particular, the program in Listing 3.10 shows how the backspace (\b), tab (\t), and carriage return (\r) work.

**#include** <stdio.h>

**int** **main**(**void**)

{

**float** salary;

**printf**("\aEnter your desired monthly salary:");/\* 1 \*/

**printf**(" $\_\_\_\_\_\_\_\b\b\b\b\b\b\b"); /\* 2 \*/

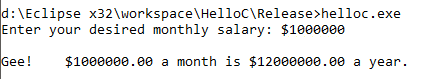
**scanf**("%f", &salary);

**printf**("\n\t$%.2f a month is $%.2f a year.", salary,salary \* 12.0); /\* 3 \*/

**printf**("\rGee!\n"); /\* 4 \*/

**return** 0;

}



**Individual Task**

Task 1.

Write a program that prints the following text:

They have just spoken to the leading psychologist.

C:   
**#include** <stdio.h>

**#include** <stdlib.h>

**int** **main**(**void**)

{

**printf**("They have just spoken to the leading psychologist.");

**return** 0;

}

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C++:  
**#include** <iostream>

**using** **namespace** std;

**int** **main**() {

cout << " They have just spoken to the leading psychologist." << **endl**;

**return** 0;

}

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Task 2.  
Write a program that reads in a floating-point number and prints it first in decimal-point notation and then in exponential notation. Have the output use the following format (the actual number of digits displayed for the exponent depends on the system).

C:  
**#include** <stdio.h>

**#include** <stdlib.h>

**int** **main**(**void**) {

**float** f;

**printf**("Set Float f= ");**scanf**("%f", &f);

**printf**("decimal %d float %e", (**int**)f, f);

**return** 0;

}

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C++:

**#include** <iostream>

**using** **namespace** std;

**int** **main**() {

**float** f;

cout << "Set float f= ";

cin >> f;

cout <<"decimal " << (**int**)f << " Float " << f << **endl**;

**return** 0;

}

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Task 3.

Write a program that reads the value of integer variables a,b,c and calculates the value of the expression (a\*10)/2+b/c+a\*b. The result displayed on the screen.

C:

**#include** <stdio.h>

**#include** <stdlib.h>

**int** **main**(**void**) {

**int** a,b,c;

**printf**("set four numbers: ");

**scanf**("%d", &a);

**scanf**("%d", &b);

**scanf**("%d", &c);

**printf**("result = %d",(a\*10)/2+b/c+a\*b);

**return** 0;

}

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C++:

**#include** <iostream>

**using** **namespace** std;

**int** **main**() {

**float** a,b,c;

cout << "Set four numbers: ";

cin >> a >> b >> c;

cout << "result = " << fixed << (a\*10)/2+b/c+a\*b << **endl**;

**return** 0;

}

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**Block diagrams**

|  |  |
| --- | --- |
| **Task 1.** | **Task 2.** |
|  |  |

|  |  |
| --- | --- |
| **Task 3.** |  |
|  |  |

**Conclusion:** learn the main types of С data. Understand the meaning of input and output commands learned to build block diagrams and how to compile in С and C++.