

Assignment 2 - Reading from the Keyboard and Using Pointers

- The problems of this assignment must be solved in C.
- The TAs are grading solutions to the problems according to the following criteria:
<https://grader.eecs.jacobs-university.de/courses/320111/2018.2gB/Grading-Criteria-C.pdf>

Problem 2.1 *Reading from the keyboard*

(1 point)

Presence assignment, due by 18:30 h today

Graded automatically with testcases only

Write a program which does the following:

1. reads two doubles from the keyboard,
2. prints the sum of the two doubles,
3. prints the difference of the two doubles (first minus second),
4. prints the square of the first double,
5. reads two integers from the keyboard,
6. computes the sum and product of the two integers,
7. prints the sum and product of the integers,
8. reads two chars from the keyboard,
9. computes the sum and product of the two chars,
10. prints the sum and product of the chars as decimal values and as chars.

You can assume that the input will be correct.

Your solution has to satisfy the requirements from the problem description and has to pass the following testcase and potentially other testcases which are uploaded. All characters are relevant for passing testcases including newlines and spaces.

Testcase 2.1: input

```
1.2
3.6
2
5
(
)
```

Testcase 2.1: output

```
sum of doubles=4.800000
difference of doubles=-2.400000
square=1.440000
sum of integers=7
product of integers=10
sum of chars=81
product of chars=1640
sum of chars=Q
product of chars=h
```

Problem 2.2 *Decimal, octal and hexadecimal numbers*

(1 point)

Presence assignment, due by 18:30 h today

Graded automatically with testcases only

Write a program which does the following:

1. reads a char from the keyboard,
2. and prints the char as character as well as in decimal, octal and hexadecimal notation.

You can assume that the input will be correct.

Your solution has to satisfy the requirements from the problem description and has to pass the following testcase and potentially other testcases which are uploaded. All characters are relevant for passing testcases including newlines and spaces.

Testcase 2.2: input

```
{
```

Testcase 2.2: output

```
character={  
decimal=123  
octal=173  
hexadecimal=7b
```

Problem 2.3 Time calculation

(1 point)

Due by Wednesday, September 19th, 10:00 h

Graded manually

Write a program where you can enter integer numbers for weeks, days and hours as input from the keyboard. Your program should compute and output by printing on the screen the total number of hours.

You can assume that the input will be correct.

Problem 2.4 Area computations

(1 point)

Due by Wednesday, September 19th, 10:00 h

Graded automatically with testcases only

Write a program that reads from the keyboard three float values for the variables a, b and h. Compute and print on the screen the areas of: the square with the side a, the rectangle with the length a and the width b, a triangle with the base a and the height h, and a trapezoid with the bases a, b and the height h.

You can assume that the input will be correct.

Your solution has to satisfy the requirements from the problem description and has to pass the following testcase and potentially other testcases which are uploaded. All characters are relevant for passing testcases including newlines and spaces.

Testcase 2.4: input

```
10  
14.5  
5
```

Testcase 2.4: output

```
square area=100.000000  
rectangle area=145.000000  
triangle area=25.000000  
trapezoid area=61.250000
```

Problem 2.5 Pointers and their content

(1 point)

Due by Wednesday, September 19th, 10:00 h

Graded manually

Write a program which reads an integer variable a from the keyboard and prints the value on the screen. Then declare and initialize a pointer ptr_a pointing to a, print the address contained in the pointer variable on the screen, increase the value of a by 5 by using the pointer variable and print the modified value and the address of the variable on the screen as well.

You can safely assume that the input will be correct.

Problem 2.6 Multiple pointers to same data

(1 point)

Due by Wednesday, September 19th, 10:00 h

Graded manually

Write a program which reads two double variables x and y from the keyboard. Then declare and initialize three pointers ptr_one, ptr_two and ptr_three such that ptr_one and ptr_two will both point to the variable x and ptr_three will point to y. By using printf show that ptr_one and ptr_two contain the same memory address and ptr_three contains a different address.

You can assume that the input will be correct.

How to submit your solutions

- Your source code should be properly indented and compile with gcc without any warnings (You can use `gcc -Wall -o program program.c`). Insert suitable comments (not on every line ...) to explain what your program does.

- Name the programs according to the suggested filenames (they should match the description of the problem) in Grader.
Each program **must** include a comment on the top like the following:

```
/*  
  JTSK-320111  
  a2.pl.c  
  Firstname Lastname  
  myemail@jacobs-university.de  
*/
```

- You have to submit your solutions via *Grader* at **<https://grader.eecs.jacobs-university.de>**.
If there are problems (but **only** then) you can submit the programs by sending mail to x.he@jacobs-university.de **with a subject line that begins with JTSK-320111**.
It is important that you do begin your subject with the coursenummer, otherwise I might have problems to identify your submission.
- Note, that after the deadline it will not be possible to submit any solutions. It is useless to send late solutions by mail, because they will not be accepted.

This assignment is due by Wednesday, September 19th, 10:00 h.