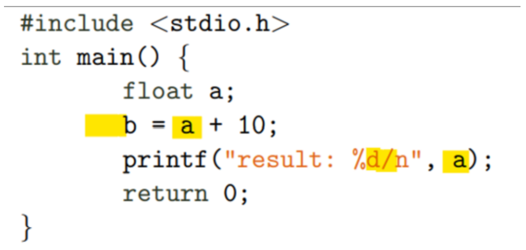
Helmut Joaquín Pfeffer A02 Systems Programming
K12105862 WS 2022

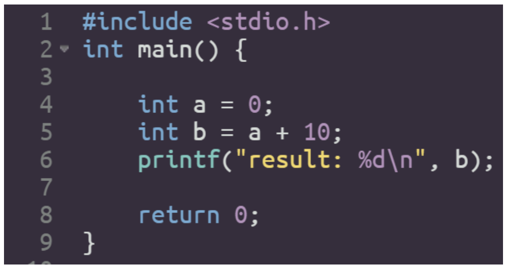
Warmup (optional):

a)



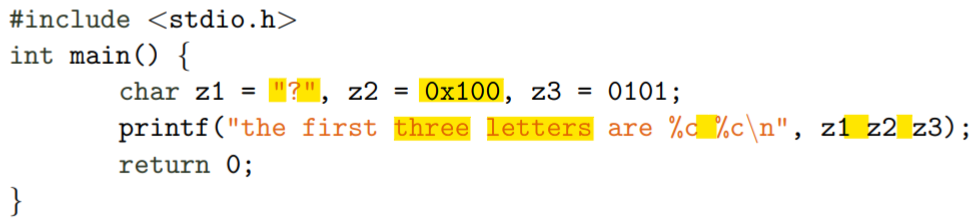
```
#include <stdio.h>
int main() {
        float a;
        b = a + 10;
        printf("result: %d/n", a);
        return 0;
}
```

- b is not declared yet, but it’s trying to be defined.
- a is not defined, but it’s trying to be used.
- To make a new line, it’s required to use a backslash, not a normal slash.
- The result is not in a. It’s not an error that would prevent the program from running, but it won’t give the desired outcome.
- The print method has a format specifier for an integer, while a is a float. Because we are just adding 10, I would change a to be an integer.



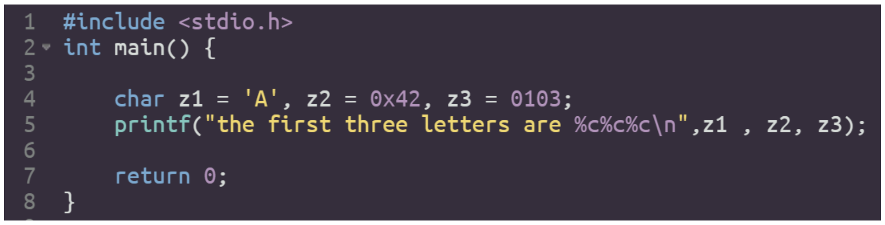
```
#include <stdio.h>
int main() {

    int a = 0;
    int b = a + 10;
    printf("result: %d\n", b);

    return 0;
}
```

b)



```
#include <stdio.h>
int main() {
        char z1 = "?", z2 = 0x100, z3 = 0101;
        printf("the first three letters are %c %c\n", z1 z2 z3);
        return 0;
}
```

- To define a char you need to use the single quotes.
- The ASCII code have exactly 256 characters, but it begins in 0, so the last one is 255. Hence, you cannot define a char to be the character 256 (100 in hexadecimal), as it´s done here.
- It’s saying that they are three, but then there are only two “%c”.
- To add multiple variables to the function prinft, commas are required.
- It´s saying that the characters are letters, but they are not. z1 is two behind (63, it should be 65), z2 is non-existent and z3 is A, so it´s either not in order, or z3 is two behind.



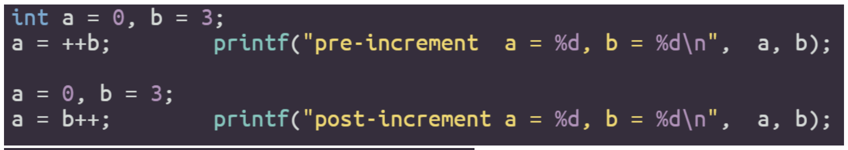
```
#include <stdio.h>
int main() {

    char z1 = 'A', z2 = 0x42, z3 = 0103;
    printf("the first three letters are %c%c%c\n",z1 , z2, z3);

    return 0;
}
```

Exercise 3.1.

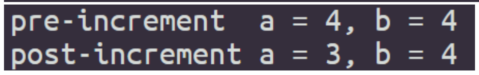
a) If you change **b--** to be **--b**, it will first take one from **b**, and **then** it will put that in **a** as well, while **b--** first puts **b** in **a**, and then takes one from **b**.
However, if you change it to be **b – 1**, it won't change **b** at all.

b) It first adds one to **a** (9 → 10), takes that result and adds something else. To calculate that else, it takes **a** and adds one again (10 →11). It then adds the first 10 to 11 and gives as an answer a 21.
If we however, change that to be **a-- + --a**, it takes first **a** and will use it to the addition. Then it takes **a** again, subtracts one, and leave it. Then it takes **a** again, subtracts one and it **uses that**, after the subtraction, for the addition. Lastly, it adds **a** before operations (9) to **a** after them (7).

c) The pre-increment operator first adds one and then uses that, while the post-increment operator first uses that and then adds one.



```
int a = 0, b = 3;
a = ++b;        printf("pre-increment  a = %d, b = %d\n",  a, b);

a = 0, b = 3;
a = b++;        printf("post-increment a = %d, b = %d\n",  a, b);
```



```
pre-increment  a = 4, b = 4
post-increment a = 3, b = 4
```

Exercise 3.2

- char c = 'B';
- short s = −1;
- unsigned int ui = 10;
- c != 'X'
- c + s
  Here, the char c is casted into a short, since short is larger than char.
- ui > s
  The short is casted into an unsigned int.
- ui ∗= 2.0
  The 2.0 is casted into an unsigned int.