

Problem 1. For each of these two code snippets, mentally compute the final value of the variable x without running the code.

Fragment 1:

```
if x >= 0:
    x=x+1
elif x >= 1:
    x=x+2
print(f"x={x}")
```

Fragment 2:

```
if x >= 0:
    x=x+1
if x >= 1:
    x=x+2
print(f"x={x}")
```

Problem 2. Write a program that prompts the user to enter three integer numbers and writes a message if they are in ascending order.

Problem 3. Write a program that prompts the user to enter five integer numbers and choose the greatest one.

Problem 4. Write a program to solve any first degree equation in the way: $ax + b = 0$, where x is the unknown and a and b two real numbers entered by the user.

Problem 5. Write a program that reads an integer number and prints a menu with the following three options:

- a. Calculate the square of the number
- b. Calculate the cube of the number
- c. Calculate 2 times the number

The user enters a letter and, depending on this letter, the program will do the appropriate operation, showing the result to the user.

Problem 6. Write a program that prompts the user to enter 4 integer numbers in the range [0-100] (representing the marks of a student in different tests) and calculate the average mark. Finally, the program will write the average mark and the letter associated with this mark, according with the following conversions:

[90,100] is converted to A
[80,90) is converted to B

[70,80) is converted to C
[60,70) is converted to D
[0,60) is converted to E

Problem 7. Taxes are for all. You know that according to your incomes you pay a ratio of them as taxes, the higher you earn, the higher the ratio. So if you earn less than 12000 you don't pay, up to 35000 you pay the 20%, up to 50000 the ratio is set to 30%, incomes less or equal than 70000 pays a 35%, while in any other case you pay the 50%. Write a program that asks the user for his/her annual incomes and then prints both the ration and the amount to pay as taxes and the monthly payment.

Problem 8. Prompt the user for his/her mark in the subject. If higher or equal to 5, the user pass.

Problem 9. Prompt the user for his/her mark in the subject. If higher or equal to 5, the user passes; otherwise, the student fails.

Problem 10. Prompt the user for his/her mark in the subject. If smaller than 5 then the student fails (E), but if the mark is in [5.0, 7.0), then the student pass with D. Further, if the mark is in [7.0, 9.0) the student pass with C. In case of a mark in [9.0, 10.0) the student pass with B, while if the user has a 10.0 then the student pass with A. **Comment:** this sequence of marks does not necessarily have any relation with official marks, is just an exercise!

Problem 11. Determine if a year is leap or not. A leap year must be either divisible by 4 but not by 100 or divisible by 400. Show a suitable message for each case.

Problem 12. Given a polynomia $p(x) = a \times x^2 + b \times x + c$, compute the possible roots. Firstly, if $b^2 - 4 \times c \times a$ is zero, then there is a double root. But if $b^2 - 4 \times c \times a$ is positive, then we have two different roots. Finally, if $b^2 - 4 \times c \times a$ is negative, then we have imaginary roots and we only show a message telling so.

Problem 13. Dragons and dungeons: Ask the user for a value between 0 or 1. The program must generate a random value in the interval [0.0, 1.0]. If the value given by the user is smaller than the random one the dragon eats the user. Otherwise, the user is free!

Problem 14. Rock-Paper-Scissors. Yeah, you may know... ROCK defeats SCISSORS, which beats PAPER, which in turn wins to ROCK! Let's make it simpler using integers -so ROCK is 0, PAPER is 1 and SCISSORS is 2-. We have two players -user1 and user2- and we need to ask each of them for a try -one after the other-, which must be an integer with value 0, 1 or 2. Then you can decide who wins or loses. Write a program that implements this game with two users, first one player introduce his/her go, and so does the second. The program should output who wins or if they match.

Problem 15. Rock-Paper-Scissors, version 2. In this release, the second user is the ma-

chine! So you must generate a random integer between 0, 1 or 2. The remaining decisions are exactly as in the previous exercise but if the second user wins then you must say is the computer who defeats the mankind!

Problem 16. Rock-Paper-Scissors, the final version. You must first ask the user for one or two players. Then, you must ask the user or users for the name and run the game as before. In the case of two players, we are like in the first release of the game; otherwise we are in the second release.