Front page

IBE151 - Practical programming

- **Date**: 20.02.2023
- **Time:** 09.00-13.00, including time for any practical and technical actions needed to hand in your exam paper.
- **Supporting materials:** All supporting materials permitted. It is not allowed to cooperate with or receive help from others, except from group members during a group exam. It is not allowed to use artificial intelligence to answer exam questions for you.
- **Number of questions:** 5
- **Technical, administrative or academic questions:** +47 71 19 59 90 or studentweb@himolde.no

Keep your mobile phone close by. Important messages concerning all candidates might come by sms.

The best of luck!

Information from lecturer

IBE151 Practical Programming

You cannot import any modules in this exam.
Type annotations are mandatory.

Pay especial attention to answer the question.

- Document your functions from the start so you don't forget what has been asked you to do.
- Partial answers are graded according to the quality of the answer. Even if you don't know how to fully answer the exercise, you should develop your (correct) solution as much as you can.
- If you are unsure about how to answer a question, make some reasonable assumptions and answer the exam. **Don't forget to state what you assumed.**

Be a smart exam taker - **if you get stuck on one problem go on to another problem**. Also, don't waste your time giving irrelevant (or not requested) details.

Wish you success in your exam!

Avoid cheating

Cheating is a serious breach of trust towards fellow students, the university college and society.

An exam is a student's individual work. Collaboration with others is not allowed.
If quoting from a source, references to the source must be provided.

The use of chatbots such as chatGPT is not allowed in this exam.

Upon delivery of my work, I also confirm that I agree with the following:

- I confirm that this is my own individual work.
- I confirm that I have not collaborated with anyone else (except other group members if this is a group exam).
- I confirm that this is not self plagiarism.
- I confirm that I have not used artificial intelligence to answer the exam question for me.
- I confirm that I have provided references to the sources I have used.
- I understand that it is academic dishonesty and cheating to collaborate with others, or present others' work as my own.

I agree and wish to submit my work for review.

Molde University College has a duty to react against cheating and attempted cheating in all parts of the academic activities. More information about cheating.

1 Question

A company must select one employee for interacting with a visitor. The visitor speaks a number of languages (at least 1). The company would like to select one employee that speaks at least one language that the visitor speaks.

Given:

(1) the set of languages the visitor speaks,

(2) a dictionary where the keys are the ID of the employees and the values are the lists of languages each employee speaks,

(3) an employee ID,

Define a function that **returns True** if the employee whose ID was passed as argument can be selected for interacting with the visitor, and **False** otherwise.

Header**:**

def canInteract (visitor: set, employees: dict, id: int) -> bool:

Example:

visitor = {"Japanese", "Spanish"}

employees = {1020: ["English", "Norwegian"], 667: ["English"], 2212:["Spanish"]}

Sample params	Sample return
1020	False
667	False
2212	True

Fill in your answer here

2 Question

You are organizing a bowling activity for a group of students and have a restricted budget.
To enter the place, the venue charges a price of 100 NOK for a group of up to 12 people, 120 NOK for a group from 13 up to 50 people and 130 NOK for a group of more than 50 people. Besides, enough bowling lines must be rented for all the students to play simultaneously. Each bowling line is used simultaneously by up to 4 students. Any number of bowling lines can be rented for 200 NOK each.
Write a function that, given the budget and the number of participants in the activity, returns **True if the budget is enough** and **False otherwise**.

Header:
def budget_OK(budget: int, participants: int) -> bool:

Sample arguments	Sample return
0, 1	False
700, 12	True
699, 12	False
2721, 50	True
2719, 50	False

Fill in your answer here

3 Question

A librarian will move all the books from a shelf. To that end, he needs to know in advance how many books will be moved. The books in the stands are ordered by author's surnames in lexicographic (*alphabetical)* order. All the names are capitalized. In the shelf there is only 1 copy of a book per author, so we can identify a book by its author.
Design a function that, given the list of book authors in the library and two strings, return how many of the authors in the list are lexicographically in between those strings.

Params: ["HUGO, VICTOR" , "ASIMOV, ISAAC", "URRUTIA, SEBASTIAN"], "ANA", "BARCA"
Returns: 1

Fill in your answer here

4 Question

A traveler needs to get to her destination on time. She examines the bus schedule, but there are too many buses. To help her, you will design a function that receives:

- the bus schedule as a list,
- the current time in minutes over 14:00h, and
- the time limit (also in minutes over 14:00h) for reaching her destination

and **returns a list with the bus lines** she can take to get to her destination within the time limit.

Each element of the bus schedule list is a tuple with the **name of the bus line**, the **departing time as minutes over 14:00h** and the **time it takes from the bus station to her destination in minutes**. Only lines departing from the bus station to her destination are included.

Example:
buses = [("701a", 10, 20), ("702a", 20, 15), ("703a", 0, 10), ("704", 38, 13)]
now = 05
limit = 50
returns = [("701a", 10, 20), ("702a", 20, 15)]

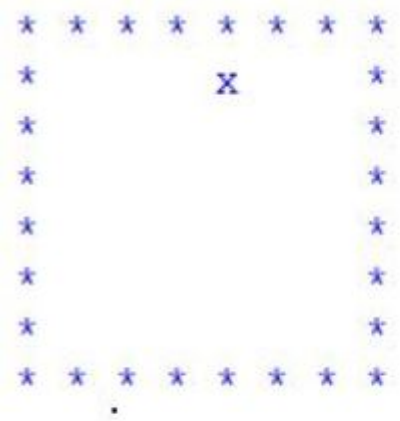
Fill in your answer here

5 Question

Write a function that, given the integers n, a and b, draws

- an n x n square using "* " ,
- an "x " at position (a, b) (line a, column b)

The top left position is (0, 0)
Your drawing must be in the format of the following figure:



This is 8 x 8 square. x is at position (1, 4)

Fill in your answer here