# Introduction to programming exam

31-March-2025 (B)

## Evaluation: Python Expressions and Behavior

Evaluate each of the following Python expressions. **Write the value or result** that each one produces. Assume no syntax errors.

|  |  |
| --- | --- |
| **1.**  for i in range(5,9):  print(i \* i, end="-") | **6.**  c = “yes" if 3 > 5 else "no"  c |
| **2.**"prisencolinensinainciusol"[:10:2]  Suggestion:  Remember range with 3 parameters | **7.**  x = [1, 2, 3]  x.append([4, 5])  x |
| **3.**len(set("banana")) | **8.**"er" in "elephant" |
| **4.**[1, 2]\*2 + [3, 4]\*2 | **9.** "abc" \* 2 |
| **5.**(1, 2, 3)[-1] | **10.** len((1, 2, (3, 4))) |

## Exercise: Validating Secret Code User Input (with Parameters)

## Write a Python function named ask\_secret\_code() that repeatedly asks the user to enter a secret code until they type the correct one. The function should:

## Use a while loop to continue prompting until the correct code is entered.

## Use the built-in input() function to read user input.

## Compare the input to a predefined code stored inside the function.

## Return True once the correct code is entered.

## You may assume the input is always a string.

## Exercise: Filter Even Numbers from a List

You are asked to write two functions:

1. is\_even(n): This function takes an integer n and returns True if n is a even number, otherwise returns False.
2. filter\_evens(lst) This function takes a positive integer n and returns a list of all even numbers filter only the even numbers. You must use the is\_even() function inside filter\_evens ().

Example:

filter\_evens(6) # Output: [2, 4, 6]

Reminder:

* A even number is greater than 1 and divisible by 2.

## Exercise: Convert NATO Alphabet to Text (Up to 100)

|  |  |
| --- | --- |
| Letter Code Word  A Alpha  B Bravo  C Charlie  D Delta  E Echo  F Foxtrot  G Golf  H Hotel  I India  J Juliett  K Kilo  L Lima  M Mike  N November  O Oscar  P Papa  Q Quebec  R Romeo  S Sierra  T Tango  U Uniform  V Victor  W Whiskey  X X-ray  Y Yankee  Z Zulu | Write a function called nato\_to\_text(nato\_string) that converts a string of NATO phonetic alphabet words into a plain text word (only uppercase letters, no digits or punctuation).   * The input is a string of NATO words (e.g., "Alpha Bravo Charlie"). * You may assume the input is valid, case-insensitive, and contains only letters. * The function must return the reconstructed word in uppercase letters.   Examples: nato\_to\_text("alpha") # Output: "A"nato\_to\_text("Delta echo") # Output: "DE"nato\_to\_text("foxtrot Lima oscar") # Output: "FLO" nato\_to\_text("charlie hotel alpha tango") # Output: "CHAT"  Suggestions:   * Create a dictionary that maps each NATO word to its corresponding letter * Use .lower() and upper on the input to make it easier to match dictionary keys and to generate the output. * Use .split() to turn the input into a list of words: |

## Exercise: Return Maximum and Minimum words in a list as a Tuple

Write a function named longest\_and\_shortest(words) that takes a non-empty list of strings and returns a tuple containing:

* the longest word in the list as the first element
* the shortest word in the list as the second element

You must not use the built-in max() or min() functions.

Use a for loop and manual comparison using len().

longest\_and\_shortest(["apple", "banana", "kiwi", "pear"]) # Output: ('banana', 'kiwi')

longest\_and\_shortest(["hi", "hello", "hey"]) # output “hello” “hi”

## Exercize: Python Library (Student Records)

The following Python code uses the pandas library to create a table of student data.

import pandas as pd

import numpy as np

# Define the data

data = {

"ProductID": [201, 202, 203, 204, 205, 206, 207],

"Name": ["Laptop", "Monitor", "Keyboard", "Mouse", "Webcam", "Printer", "Tablet"],

"Category": ["Electronics", "Electronics", np.nan, "Accessories", "Accessories", "Office", np.nan],

"Stock": [25, np.nan, 100, 50, np.nan, 10, 5]

}

# Create the DataFrame

df = pd.DataFrame(data)

# Display the DataFrame

print(df.head())

Questions:

* How many rows does the table contain?
* How many columns does the table contain?
* What is the categoryof the poducrt named “Mouse”?
* What value is missing (NaN) for the product with ID 203?
* Write exactly what is printed by the last line (print(df.head())), reproducing the table as it would appear on the screen.
* Write the code to remove all rows where the category is missing.
* Write the code to replace missing value of stock column with the value 0.