Final Exam (Solution): Computer science 2

Exam's duration:1H30   Date: May 24, 2025

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1 Exercise (05 points)

Write a Python program that reads 100 numbers entered by the user (from the keyboard) and counts how many of them are even and how many are odd.

1.1 Solution (05 points)

```python
#Initialize counters for counting odd and even numbers
count_odd = 0
count_even = 0

# Iterate through each element
for i in range(100) :
  number = int(input("Enter a number :"))
  # Check if the current number 'x' is even by evaluating 'not x % 2'
  if  number % 2 == 0:  # If 'x' modulo 2 equals 0, it's even
    # Increment the count of even numbers
    count_even += 1
  else:
    # If 'x' modulo 2 doesn't equal 0, it's odd; increment the count of odd numbers
    count_odd += 1

# Print the total count of even and odd numbers
print("Number of even numbers : ", count_even)
print("Number of odd numbers : ", count_odd)
```

2 Exercise (05 points)

Write a program that calculates the factorial of a given number. For example, the factorial of 5 (denoted as 5!) is calculated as 1 * 2 * 3 * 4 * 5 = 120.

Note :   The factorial is not defined for negative numbers.
The factorial of zero is 1 (i.e., $0! = 1$).

2.1 Solution (05 points)

```python
n = int(input('Please enter a number: '))
fact = 1
if n < 0:
  print('Value out of range !')
else:
  for i in range(1,n+1) :
    fact = fact * i
  print('Factorial of :', n , ' is:', fact)
```

3 Exercise (05 points)

Write a Python program that reads 10 student grades (entered by the user), stores them in a list, then calculates and displays the minimum, maximum, and mean (average) values of the grades.

3.1 Solution (05 points)

```python
tab   = []
for j in range(10):
  val = float(input('Give a note ('+str(j+1)+'): '))
  tab.append(val)
mean = 0
min = tab[0]
max = tab[0]
for j in range(10):
  mean += tab[j]
  if tab[j] < min:
    min = tab[j]
  if tab[j] > max:
    max = tab[j]

mean = mean / 10
print('The mean = ',mean)
print('The max = ',max)
print('The min = ',min)
```

4 Exercise (05 points)

Write a Python program that inserts a new element into an already sorted list (in descending order) while preserving the sorted order.

Example :

```
list before = [ 9 , 8 , 5 , 3 , 1 ]
element o insert = 2
list after =  [ 9 , 8 , 5 , 3 , 2, 1 ]
```

4.1 Solution (05 points)

1.

```python
list = []
nb = int(input('Give the number of elements of list : '))
for i in range(nb):
  val = int(input('Enter a number : '))
  list.append(val)
print('list before =',list)
element = int(input('Give the number to insert in the list : '))
i = 0
while i <len(list) and element <  list[i] :
  i += 1
list.insert(i, element)
print('list after :',list)
```

2.

```python
list = []
nb = int(input('Give the number of elements of list : '))
for i in range(nb):
  val = int(input('Enter a number : '))
  list.append(val)
print('list before =',list)
element = int(input('Give the number to insert in the list : '))
i = 0
while element <  list[i]:
    if i==len(list)-1:
      i += 1
      break
  i += 1
list.insert(i, element)
print('list after :',list)
```

Good Luck