

Programming Fundamentals LAB – BSDSF23

(Both Morning and Afternoon)

Lab 12 – 05-12-2023

Note: YOU may USE Command Prompt or **Mu Editor** to interpret and execute all the PYTHON programs. Use of any IDE, except **Mu Editor** is not allowed for this LAB, despite you are expert. Unless and until you convinced me of it personally.

Also note, if the computer systems are not equipped with python interpreter, you may use online compiler at the following URL highlighted in yellow. And in case it is also difficult to use for any reason, you need to do the paperwork within the LAB time for all tasks, as discussed in the class sessions. Thanks

<https://www.programiz.com/python-programming/online-compiler/>

Tasks set 1 (10 each)

1. Print the following patterns using nested loops for N rows (in examples below, N is 5). You need to use **ord** and **chr** functions for the last pattern.

a)	b)	c)	d)	e)
**	1	9	0	a
****	12	89	12	ab
*****	123	789	345	abc
*****	1234	6789	6789	abcd
*****	12345	56789	01234	abcde

Tasks set 2 (20 and 30)

2. Write function to sort an array in **descending order** using **selection sort** algorithm, and later **test** it in the **main** function. Selection sort logic is too different from the bubble sort logic. The selection sort works as follows:

- Outer loop iterates N-1 times for values of its variable as 0,1,2,3,4, . . . , N-2
- In the j^{th} iteration of outer loop, the location of the minimum value in sub-array $j . . N-1$ is searched
- The above searching requires a nested loop for some variable say i , and after the inner loop, the location of the minimum may be associated with another variable say s
- Before the next iteration of the outer loop, the values in the array at j^{th} and s^{th} location should be interchanged.

SELECTION-SORT(A)

```
n ← length[A]
for j ← 0 to n-2
    smallest ← j
    for i ← j+1 to n-1
        if A[i] < A[smallest]
            smallest ← i
    exchange A[j] ↔ A[smallest]
```

Fig a: Selection Sort logic for ascending order

3. Take an array of a few numbers (salaries of employees) between 12000 and 1200000 inclusive. Print the salaries and scales of all employees in two columns using **a)** multiple independent if structures, **b)** nested if structures, and **c)** if, elif, . . . , else structures.

Grade	W	D	C	B	A
Low	12000	50001	125001	500001	900001
high	50000	125000	500000	900000	1200000

Thanks, for your patience

If you got time, solve some pending tasks from previous labs