Helwan University – Faculty of Computers and Artificial Intelligence (FCAI) – **Computer Science Department**
Academic Year *(2019/2020)* **Spring Semester** *(2ⁿᵈ Term)*
CS112 Programming Languages 1 [*General Division | Medical Informatics Prog. | Software Engineering Prog.*]

Exercises - Problems Sheet # 2: Char Arrays, Enumerations, Structs, & Pointers

No. Of Questions: 10 **No. Of Pages: 2**

▶ **To be submitted during the Labs of week 7 (Starting on Saturday the 21ˢᵗ of March).**

▶ **Students will lose 2 marks if this homework is not delivered on time or found out to be copied.**

▶ **The submitted solutions should be handwritten and NOT typed/printed.**

Answer the following:

1) Write a C function that concatenates two input strings S1 and S2 in string S1.

2) Write a C program that reads string S1 and certain letter from the user, then call your own function that return the number of occurrences of the given character in the given string.

3) Write a C function that take two strings (array of characters) and return one if the 1st is part of the 2nd and zero otherwise

4) Write a C code to reverse a string by recursion.

5) Write a function ``replace'' which takes a string as a parameter and replaces all spaces in that string by minus signs and delivers the number of spaces it replaced.

6) What is the output of these codes

a)
```
int main()
{
    enum status {pass, fail, absent};
    enum status stud1, stud2, stud3;
    stud1 = pass;
    stud2 = absent;
    stud3 = fail;
    printf("%d %d %d\n", stud1, stud2, stud3);
    return 0;
}
```

b)
```
int main()
{
    enum days {MON=-1, TUE, WED=6, THU, FRI, SAT};
    printf("%d, %d, %d, %d, %d, %d\n", MON, TUE, WED, THU,
FRI, SAT);
    return 0;
}
```

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7) Declare a structure Employee with id_no, salary, birth_date – which is day, month, and year- id for 5 tasks the employee has. For example the data for an employee may be: id_no = 5, salary = 7500, birth_date = { day= 3, month= 8, year = 1980}, tasks_ids = {1, 3, 4, 9, 12}.

    a) For the previous declaration, write a function which input one employee data.

    b) For the previous declaration, write a function which take an array of employee's data and an id_no, the function should search for that employee in the employees array and return his salary, or return -1 if the employee id not found.

    c) Use all the previous in a program that enter data for 5 employees, then the program takes one id_no for an employee, search for it, if found return his salary, otherwise write "NOT FOUND".

8) Show the output:

```
main() {
    struct s {
        double x;
        int  y;
    } a_struct;
    printf("The size of a_struct: %d-byte\n",
sizeof(a_struct));
}
```

9) Trace the following:

A)

```
int main(void)
{
    char ch = 'c';
    char *chptr = &ch;
    int i = 20;
    int *intptr = &i;
    float f = 1.20000;
    float *fptr = &f;
    char *ptr = "I am a string";
    printf("\n [%c], [%d], [%f], [%c], [%s]\n",
*chptr, *intptr, *fptr, *ptr, ptr);
    return 0;
}
```

B)

```
int main()
{
    int array[10] = { 2, 5, 9, 0, 3, 7 , 2};
    int *data_ptr;
    int value;
    data_ptr = &array[0];
    value = *data_ptr++;
    printf("%d\n", value);
    value = *++data_ptr;
    printf("%d\n", value);
    value = ++*data_ptr;
    printf("%d\n", value);
    value = *data_ptr;
    printf("%d\n", value);
}
```

10) Redo problem No. 1 to No. 5 from Sheet 1 using **pointer/offset notation**

With our best wishes;