

Question 1 (22 POINTS):

Find the output of the following programs:

I)

```
#include <stdio.h>
#include <string.h>

int echo (char s[]) {
    if(strlen(s) == 0)
        return 0;
    else {
        printf("%d\n",strlen(s));
        s[strlen(s)/3]='\0';
        return echo (s);
    }
}

main() {
    char s[]="ICS103 Final Exam";
    printf("%d",echo(s));
}
```

OUTPUT

II)

```
#include <stdio.h>
#include <string.h>
main (){
    char str[]={"This#is#the#final#test"};
    char *token;
    token = strtok(str, "s");
    while ( token != NULL ) {
        puts(token);
        token = strtok( NULL, "s");
    }
}
```

OUTPUT

III)

```
#include <stdio.h>

main() {
    char s[]="KFUPM";
    int i;
    for (i=0;s[i]!='\0';i++) {
        if(i%2==0)
            s[i]=s[i]+1;
        else
            s[i]=s[i]-1;}
    puts(s);
}
```

OUTPUT

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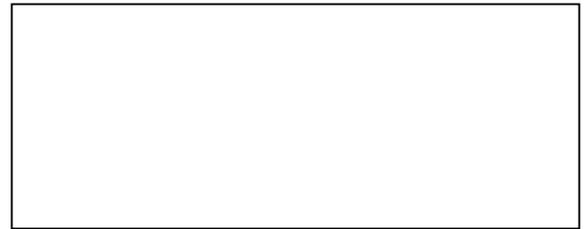
IV)

```
#include <stdio.h>
#include <string.h>
#include <ctype.h>

void test3(char a[]) {
    int i;
    for (i = 0; i < strlen(a); i++)
        a[i]=tolower(a[i]);
}
void test4(char a[], char b[], int n) {
    int i;
    for (i = 0; i < n; i++)
        b[i]=a[i];
}
int main(void) {
    char str1[] = "Ahmad is Tall", str2[] = "MAD", str3[strlen(str2)];
    int i, nf = 1;

    test3(str1);
    test3(str2);

    for(i = 0; i < strlen(str1) && nf; i++){
        test4(&str1[i],str3,strlen(str2));
        nf = strcmp(str3,str2);
    }
    if (nf)
        printf("No\n");
    else
        printf("Yes\n");
    return 0;
}
```

OUTPUT**IV)**

```
#include <stdio.h>
#include <string.h>
#include <ctype.h>

int search( char s[], int st) {
    int i;
    for(i = st - 1; i >= 0;i--) {
        if(isalpha(s[i]))
            return i;
    }
    return -1;
}
main() {
    char line[] = "8A*Z2#m;r<9q+b#";
    int res=search(line,strlen(line));
    while(res != -1) {
        printf("%d\n",res);
        res=search(line,res);
    }
}
```

OUTPUT**See Next Page!**

Question 2 (12 POINTS):

Write a program that reads a line of characters -including spaces- into a string variable **X** (maximum of 81 characters). Then, it copies to another string **Y** all the non-digit characters in **X**. For example, if **X** = "ICS103 & MATH101", then **Y** = "ICS and MATH".

- Don't use any loop to read **X**.

Question 3 : (17 points)

Write a function coding which receives a string and modifies it as follows:

- All letters are converted to lower case.
- Letters from 'a' to 'x' are modified by adding 2 to each letter i.e. 'a' becomes 'c', 'b' becomes 'd',..., 'x' becomes 'z'. The remaining 2 letters 'y' and 'z' become 'a' and 'b'.
- All remaining characters are not modified.

Put the function definition of coding after the main function. No printing from the function coding.

Your main function will read a string from the user, then it will call the function coding. After that, it will print the modified string as shown below:



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