

## Problem Set 6

1. What is the output of the following program?

```
#include <stdio.h>
#define SUM(a, b) a+b

int main() {
    const int a = 10, b = 20;

    printf("a=%d, b=%d, a+b=%d (a+b)*(a+b)=%d\n", a, b, SUM(a, b), SUM(a, b) * SUM(a, b));
}
```

2. What is the output of the following program?

```
#include <stdio.h>

int main() {
    int a[10];
    int b[] = {};
    int c[] = {1, 2, 3};
    const int d[10] = {1, 2, 3};
    int ii;

    printf("sizeof: a=%d, b=%d, c=%d, d=%d\n", sizeof(a), sizeof(b), sizeof(c), sizeof(d));

    printf("\narray a: ");
    for (ii = 0; ii < sizeof(a) / 4; ++ii)
        printf("%d ", a[ii]);

    printf("\narray b: ");
    for (ii = 0; ii < sizeof(b) / 4; ++ii)
        printf("%d ", b[ii]);

    printf("\narray c: ");
    for (ii = 0; ii < sizeof(c) / 4; ++ii)
        printf("%d ", c[ii]);

    printf("\narray d: ");
    for (ii = 0; ii < sizeof(d) / 4; ++ii)
        printf("%d ", d[ii]);

    printf("\n");
}
```

3. What is the output of the following program? Why?

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

```

#define DEFA 10
#define DEFB 10+1
#define DEFC DEFA+2
#define DEFD DEFC+1

int main() {
    enum {A, B, C, D=-1, E, U, W, X=223, Y, Z};
    printf("A=%d, B=%d, C=%d, D=%d, E=%d, U=%d, W=%d, X=%d, Y=%d, Z=%d\n", A, B, C,
D, E, U, W, X, Y, Z);
    printf("DEFA=%d, DEFB=%d, DEFC=%d, DEFD=%d\n", DEFA, DEFB, DEFC, DEFD);
}

```

4. Find compile-time errors in the following program.

```

#include <stdio.h>

#define DEFA 10

int main() {
    enum {A, B, C, D=-1, E, U, W, X=223, Y, Z};
    const int a = 10;
    DEFA = 20;
    A = 30;
    a = 40;
}

```

5. Modify the following program such that the two characters printed preserve their original order. Thus, for instance, AC can be printed but not CA, CD can be printed but not DC.

```

#include <stdio.h>

int main() {
    char arr[] = "ABCD";
    const int arrsize = sizeof(arr) / sizeof(char) - 1;
    int ii, jj;

    for (ii = 0; ii < arrsize; ++ii) {
        for (jj = 0; jj < arrsize; ++jj) {
            printf("%c%c\n", arr[ii], arr[jj]);
        }
    }
}

```

6. Write a program to check if a given input string is a palindrome – it reads the same forward and backward. For instance, MALAYALAM and NITIN.

7. Write a program to read several positive numbers (until -1 is entered) and then print the number of times various numbers were entered. For instance, if the input is 9 32 323 21 22 32 9 9 -1, the output should be as below. Assume that the numbers are within the range 0..1000.

```
9 3
21 1
22 1
32 2
323 1
```

8. Write a program to read the name of a state, and print its capital. For instance, if the state is TamilNadu, the output should be Chennai. Can you solve the issue w.r.t. case-sensitivity? That is, TamilNadu, tamilnadu, TAMILNADU, TamILnAdu should be treated uniformly.

9. Write a program to check if two strings are anagrams of one another. For instance, CIVILENGINEERING is an anagram of EVILNIECERINGING.

10. Write a program to read friendship pairs, and print those in graphviz format. For instance,

```
ronak abhishek
abhishek babar
abhishek mishra
ronak shankar
babar ronak
shankar ram
```

The output should be:

```
graph {
    ronak -- abhishek
    abhishek -- babar
    abhishek -- mishra
    ronak -- shankar
    babar -- ronak
    shankar -- ram
}
```

Copy paste the output in the text box at this url: <http://sandbox.kidstrythisathome.com/erdos/> and see the generated graph.