1. Draw an automaton that accepts a regular expression **(a|c)?b*c$^+$**

2. Write a flex program that replaces all occurrences of "abc" with "bca" and double every integers.

E.g. **input: abc 20 grapeabc de**
Output: cba 40 grapecba de

3. Write a **Flex specification** that replaces every occurrence of a single & with && and print the number of & in the input. The input can contain any symbol.
E.g. **Input:** x& ab && 2.3
Output: x&& ab &&&& 2.3
The number of & in the input: 3

4. (1) main()
(2) { int* x; int** y; int z;
(3) x = (int*)malloc(sizeof(int));
(4) y = (int**)malloc(sizeof(int*));
(5) *y = (int*)malloc(sizeof(int));
(6) **y = 6;
(7) x = *y;
(8) z = 3;
(9) *x = z;
(10) printf("%d\n", **y);
(11) z = 2;
(12) printf("%d\n", *x);
(13) *x = 4;
(14) printf("%d\n", z);}

5. Give the output of the following program using (1) **call-by-reference;** (2) **call-by-name**.

```
int i, a[3];
void f (int x, int y){ x = (x*y) mod 3; y = y – x;}
main(){ i = 0; a[0] = 1; a[1] = 2; a[2] = 0;
        f(i, a[i]); print("%d %d %d %d\n", i, a[0], a[1], a[2]);
        f(a[i], a[i]); print("%d %d %d\n", a[0], a[1], a[2]);
}
```