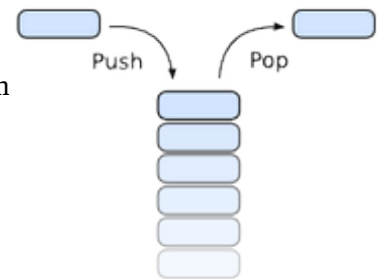


Practice problems in C & C++ Set - 2

Problem 1: Write a program that handles a record of type **R** (shown as a box) with operations called **push**, **pop** and **see** (see figure). The operation **push** results in keeping a new record on the top of the pile. The operation **pop** removes it from the top. The operation **see** prints the contents of record on the top. Each record has the following information:



Record **R**:

Name:

Age:

Id:

Show the implementation of the operation **see** after a few **pushes** and a few **pops** as decided by the user. There should be no maximum limit on records coded in the program.

Problem 2: Implement and verify decimal to binary converter for a positive integer. The program reads an integer and prints the binary number for the same. The algorithm given below must be used:

To convert from a base-10 integer numeral to its base-2 (binary) equivalent, the number is divided by two, and the remainder is the least-significant bit. The (integer) result is again divided by two, its remainder is the next most significant bit. This process repeats until the result of further division becomes zero.

For example, 118_{10} , in binary, is:

Operation	Remainder
$118 \div 2 = 59$	0
$59 \div 2 = 29$	1
$29 \div 2 = 14$	1
$14 \div 2 = 7$	0
$7 \div 2 = 3$	1
$3 \div 2 = 1$	1
$1 \div 2 = 0$	1

Reading the sequence of remainders from the bottom up gives the binary numeral 1110110_2 .

Problem 3: Let there be 10 persons (Ids 0,1,..9) who have each read 10 out of 100 books (of Ids 0,1,...99). Identify the two persons who have maximum common books between them.

Problem 4: Write a program that keeps reading numbers from keyboard and stores in an array. The requirement of the array is that, it has an initial size (capacity) of 2. If the input size happens to be bigger than the capacity, then another array with double the capacity is created and is used while destroying (*i.e.*, freeing the memory of) the earlier one. Hence if the size of the input that is being fed is 17, then the arrays that will be created are of capacities 2, 4, 8, 16 and 32 and the arrays destroyed are of the sizes 2, 4, 8 and 16. User terminates input giving a number 0. Subsequently all the numbers entered and the sum should be printed.

Problem 5: Write a function that takes a single digit number and prints the number just as in a digital watch in the fashion below. Also print its mirror image by the side of it.

Eg:

8:

```
000000    000000
 0   0    0   0
 0   0    0   0
 0   0    0   0
000000    000000
 0   0    0   0
 0   0    0   0
 0   0    0   0
000000    000000
```

2:

```
000000    000000
      0    0
      0    0
      0    0
000000    000000
 0          0
 0          0
 0          0
000000    000000
```