

10000 Introduction to Computer Science, Fall 2003 CCNY CUNY

Test 2, December 1

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1. There is a robot on a checked board (robot always occupies one square), at any moment of time it looks either north, east, south or west. It can turn left, right or step one square forward (in direction it looks); it can also check if there is a water in a square in front of it, to the left from the robot, to the right from the robot. There is a pool of water which occupies some continuous area of squares, it does not reach borders of the board. The robot stands on a square next to the pool. All squares (that are not under water) are white except for the square robot stands on - it's black. Write a program for robot (pseudocode is probably the right choice of language) to go around the pool and return to its origin (black square).
2. The pool from the question 1 is m squares long from east to west and n squares long from north to south. In order to return to its origin how many step will robot have to make at least?
3. Convert the following fragment of code to equivalent using one `switch/case`-statement and no `goto`-statements:

```
        if(q==0)
            goto 10;
        if(q==1)
            goto 20;
        goto 50;
10: printf("ha");
    goto 90;
20: printf("oh");
    goto 90;
50: if(q==3)
        printf("hi")
    else
        printf("hm");
90: printf("\n");
```

4. Write a program that reads number N then N numbers and prints how many occurrences of 1 were entered among these N numbers.
5. Write a program that reads number N then N numbers and prints only those numbers that are positive but less than 5.
6. Write a program that reads number N then N numbers and prints these numbers in reversed order (number entered first should be printed last, last entered should be printed first, etc).

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7. Show step by step execution of the following code fragment and the output it will produce:

```
int a,b,c;
c=0;
b=10;
for(a=6;b>1;a=a-1)
{
    b=a-1;
    printf("a=%d b=%d c=%d\n",a,b,c);
    c=c+a;
}
printf("a=%d b=%d c=%d\n",a,b,c);
```