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# **RAJALAKSHMI ENGINEERING COLLEGE**

**An Autonomous Institution, Affiliated to Anna University  
Rajalakshmi Nagar, Thandalam - 602 105**



**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

**GE23131 - PROGRAMMING USING C**  
*(Regulation 2023)*

**LABORATORY MANUAL**

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**Year / Branch / Section : CSE - B**

**Semester : I**

**Academic Year : 2024 - 2025**

## **Nested Loops - while and for, Jumps in Loops**

**Simple Chessboard****Problem Statement:**

Write a program that prints a simple chessboard.

Input format:

The first line contains the number of inputs T.

The lines after that contain a different value for size of the chessboard

Output format:

Print a chessboard of dimensions size \* size.

Print W for white spaces and B for black spaces.

Sample Input:

2  
3  
5

Sample Output:

WBW  
BWB  
WBW  
WBWBW  
BWBWB  
WBWBW  
BWBWB  
WBWBW

**Program:**

```

1  #include<stdio.h>
2  int main()
3  {
4      int T,size;
5      scanf("%d",&T);
6      while(T--){
7          scanf("%d",&size);
8          for(int i=0;i<size;i++){
9              for(int j=0;j<size;j++){
10                 printf("%c",(i+j)%2==0?'W':'B');
11             }
12             printf("\n");
13         }
14     }
15     return 0;
16 }
17

```

	Input	Expected	Got	
✓	2	WBW	WBW	✓
	3	BWB	BWB	
	5	WBW	WBW	
		WBWBW	WBWBW	
		BWBWB	BWBWB	
		WBWBW	WBWBW	
		BWBWB	BWBWB	
		WBWBW	WBWBW	

Passed all tests! ✓

**Print Our Own Chessboard****Problem Statement:**

Let's print a chessboard!

Write a program that takes input:

The first line contains T, the number of test cases

Each test case contains an integer N and also the starting character of the chessboard

**Output Format**

Print the chessboard as per the given examples

**Sample Input:**

2

2 W

3 B

**Sample Output:**

WB

BW

BWB

WBW

BWB

**Program:**

```

1  #include<stdio.h>
2  int main()
3  {
4      int T,d,i,i1,i2,o,z;
5      char c,s;
6      scanf("%d",&T);
7      for(i=0;i<T;i++)
8      {
9          scanf("%d %c",&d,&s);
10         for(i1=0;i1<d;i1++)
11         {
12             z=(s=='W') ? 0:1;
13             o=(i1%2==z) ? 0:1;
14             for(i2=0;i2<d;i2++)
15             {
16                 c=(i2%2==o) ? 'W' : 'B';
17                 printf("%c",c);
18             }
19             printf("\n");
20         }
21     }
22     return 0;
23 }
24

```

	Input	Expected	Got	
✓	2	WB	WB	✓
	2 W	BW	BW	
	3 B	BWB	BWB	
		WBW	WBW	
		BWB	BWB	

Passed all tests! ✓

**Pattern Printing****Problem Statement:**

Decode the logic and print the Pattern that corresponds to given input.

If N= 3 then pattern will be:

10203010011012

\*\*4050809

\*\*\*\*607

If N= 4, then pattern will be:

1020304017018019020

\*\*50607014015016

\*\*\*\*809012013

\*\*\*\*\*10011

Constraints:  $2 \leq N \leq 100$

Input Format

First line contains T, the number of test cases, each test case contains a single integer N

Output Format

First line print Case #i where i is the test case number, In the subsequent line, print the pattern

Sample Input

3

3

4

5

Sample Output

Case #1

10203010011012

\*\*4050809

\*\*\*\*607

Case #2

1020304017018019020

\*\*50607014015016

\*\*\*\*809012013

\*\*\*\*\*10011

Case #3

102030405026027028029030

\*\*6070809022023024025

\*\*\*\*10011012019020021

\*\*\*\*\*13014017018

\*\*\*\*\*15016

**Program:**

```
1  #include<stdio.h>
2  int main()
3  {
4      int n,v,p3,c,in,i,i1,i2,t,ti;
5      scanf(" %d",&t);
6      for(ti=0;ti<t;ti++){
7          v=0;
8          scanf("%d",&n);
9          printf("Case #%d\n",ti+1);
10         for(i=0;i<n;i++){
11             c=0;
12             if(i>0){
13                 for(i1=0;i1<i;i1++) printf("***");
14             }
15             for(i1=i;i1<n;i1++){
16                 if(i>0)c++;
17                 printf("%d0",++v);
18             }
19             if(i==0){
20                 p3=v+(v*(v-1))+1;
21                 in=p3;
22             }
23             in=in-c;
24             p3=in;
25             for(i2=i;i2<n;i2++){
26                 printf("%d",p3++);
27                 if(i2!=n-1)printf("0");
28             }printf("\n");
```



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```
29     }  
30     }return 0;  
31 }  
32  
33
```

	Input	Expected	Got	
✓	3	Case #1	Case #1	✓
	3	10203010011012	10203010011012	
	4	**4050809	**4050809	
	5	****607	****607	
		Case #2	Case #2	
		1020304017018019020	1020304017018019020	
		**50607014015016	**50607014015016	
		****809012013	****809012013	
		*****10011	*****10011	
		Case #3	Case #3	
		102030405026027028029030	102030405026027028029030	
		**6070809022023024025	**6070809022023024025	
		****10011012019020021	****10011012019020021	
		*****13014017018	*****13014017018	
		*****15016	*****15016	

**Armstrong Number****Problem Statement:**

The k-digit number N is an Armstrong number if and only if the k-th power of each digit sums to N.

Given a positive integer N, return true if and only if it is an Armstrong number.

**Note:**  $1 \leq N \leq 10^8$

**Hint:** 153 is a 3-digit number, and  $153 = 1^3 + 5^3 + 3^3$ .

Sample Input:

153

Sample Output:

true

Sample **Input:**

123

Sample **Output:**

false

Sample **Input:**

1634

Sample **Output:**

true

**Program:**

**Answer:** (penalty regime: 0 %)

```
1  #include<math.h>
2  #include<stdio.h>
3  int main()
4  {
5      int n;
6      scanf("%d",&n);
7      int x=0,n2=n;
8      while(n2!=0)
9      {
10         x++;
11         n2=n2/10;
12     }
13     int sum=0;
14     int n3=n,n4;
15     while(n3!=0)
16     {
17         n4=n3%10;
18         sum=sum+pow(n4,x);
19         n3=n3/10;
20     }
21
22
23     if(n==sum)
```

```
22
23     if(n==sum)
24     {
25         printf("true");
26     }
27     else{
28         printf("false");
29     }
30     return 0;
31 }
```

	Input	Expected	Got	
✓	153	true	true	✓
✓	123	false	false	✓

**Ex. No. : 32****Date : 13.11.2024****Reverse and Add Until Get a Palindrome****Problem Statement:**

Take a number, reverse it and add it to the original number until the obtained number is a palindrome.

**Constraints** $1 \leq \text{num} \leq 99999999$ **Sample Input 1**

32

**Sample Output 1**

55

**Sample Input 2**

789

**Sample Output 2**

66066

**Program:**

```
1  #include<stdio.h>
2  int main()
3  {
4      int rn,n,nt=0,i=0;
5      scanf("%d",&n);
6      do
7      {
8          nt=n;rn=0;
9          while(n!=0)
10         {
11             rn=rn*10+n%10;
12             n=n/10;
13         }
14         n=nt+rn;
15         i++;
16     }
17     while(rn!=nt || i==1);
18     printf("%d",rn);
19     return 0;
20 }
21
```

	Input	Expected	Got	
✓	32	55	55	✓
✓	789	66066	66066	✓

Passed all tests! ✓

**Ex. No. : 33****Date : 13.11.2024****Lucky Number****Problem Statement:**

A number is considered lucky if it contains either 3 or 4 or 3 and 4 both in it. Write a program to print the nth lucky number. Example, 1st lucky number is 3, and 2nd lucky number is 4 and 3rd lucky number is 33 and 4th lucky number is 34 and so on. Note that 13, 40 etc., are not lucky as they have other numbers in it.

The program should accept a number 'n' as input and display the nth lucky number as output.

Sample Input 1:  
3

Sample Output 1:  
33

**Program:**

```
1  #include<stdio.h>
2  int main()
3  {
4      int n=1,i=0,nt,co=0,e;
5      scanf("%d",&e);
6      while(i<e)
7      {
8          nt=n;
9          while(nt!=0)
10         {
11             co=0;
12             if(nt%10!=3 && nt%10!=4)
13             {
14                 co=1;
15                 break;
16             }
17             nt=nt/10;
18         }
19         if(co==0)
20         {
21             i++;
22         }
23         n++;
24     }
25     printf("%d",--n);
26     return 0;
27 }
```

	Input	Expected	Got	
✓	34	33344	33344	✓

Passed all tests! ✓