Number Guessing: Bulls and Cows

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INTRODUCTION TO NUMBER GUESSING

- 4 digits number form 0 to 9 is generated by system randomly.

- 4 digits can't be the same.

- If one digit of Guess numbers is same position and same value with the Initial number, we mark 1A.

- If one digit of Guess numbers is wrong position but same value with the Initial number, we mark 1B.
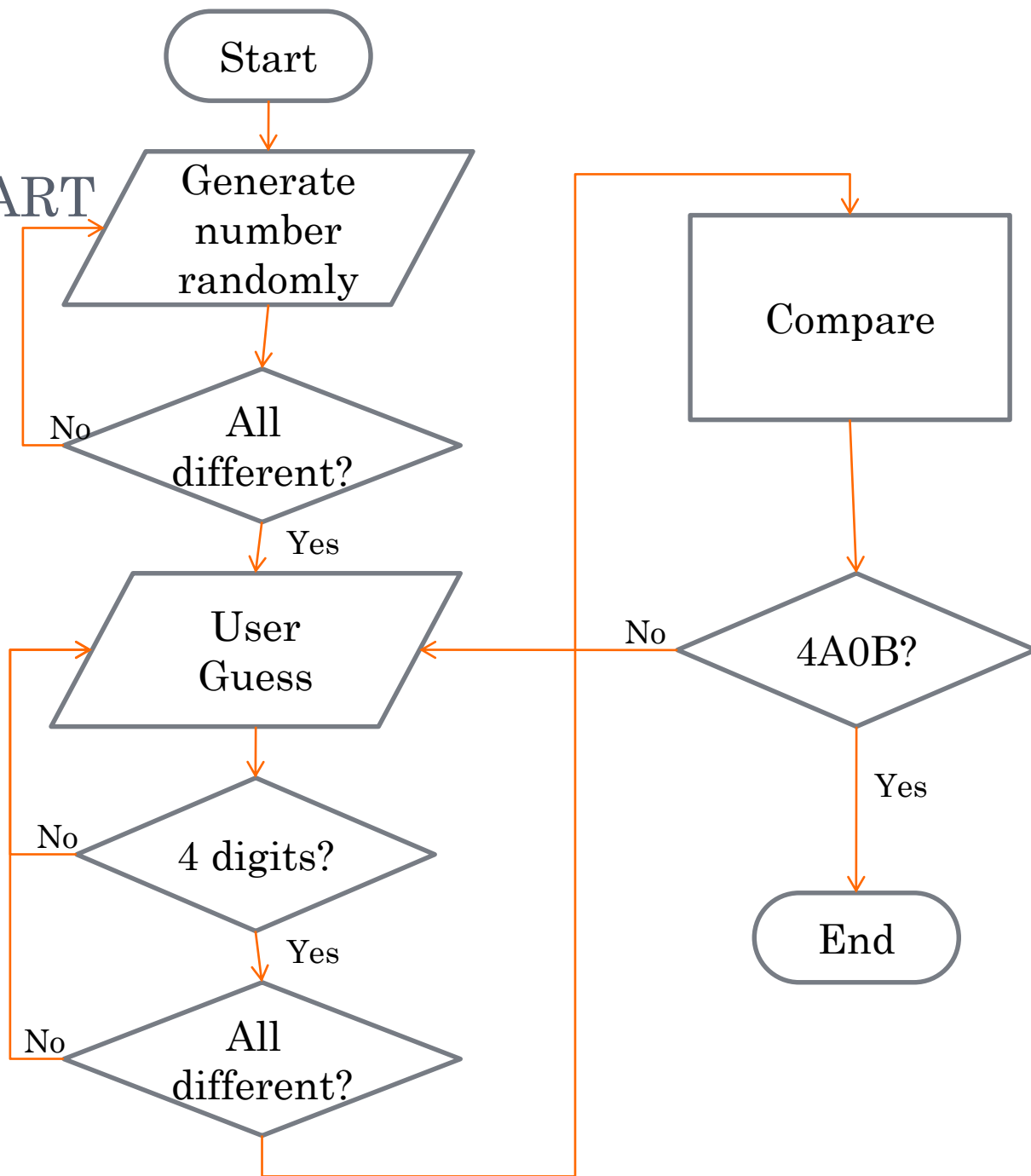
Example:
> **Initial number:4681**
> **Guess number:1284   1A2B**
> **Guess number:0679   1A**

STEPS

- Step1: generate 4 digits number randomly
  - Different from each other?
- Step 2: user input 4 digits number
  - Different from each other?
  - 4 digits?
- Step3: compare position and value

FLOW CHART

Start

Generate number randomly

All different?
- No
- Yes

User Guess

4 digits?
- No
- Yes

All different?
- No

Compare

4A0B?
- No
- Yes

End

GENERATE NUMBER RANDOMLY

```
#include <stdio.h>
#include <stdlib.h>
#include <time.h>
void main()
{
  int a;
  srand(time(NULL));
  a=(rand()%10);
}
```

a = rand() % 10;
Means
A is rand() mod 10

```
11    int initial[4]={0,0,0,0};//random number
12    int count=0;
13
14    srand(time(NULL));
15    initial[count]=(rand()%10);//generate 1st digit
16    count++;
17    bool flag = true;
18    //generate 2nd 3rd 4th digit
19    while(count<4)
20    {
21        flag=true;
22        initial[count]=(rand()%10);
23        for(int i=0;i<count;i++)//compare with front numbers
24            if(initial[count]==initial[i])
25                flag=false;//mark same value with another
26        if(flag==false)//if same value with another
27            continue;//don't do count++
28        count++;
29    }
```
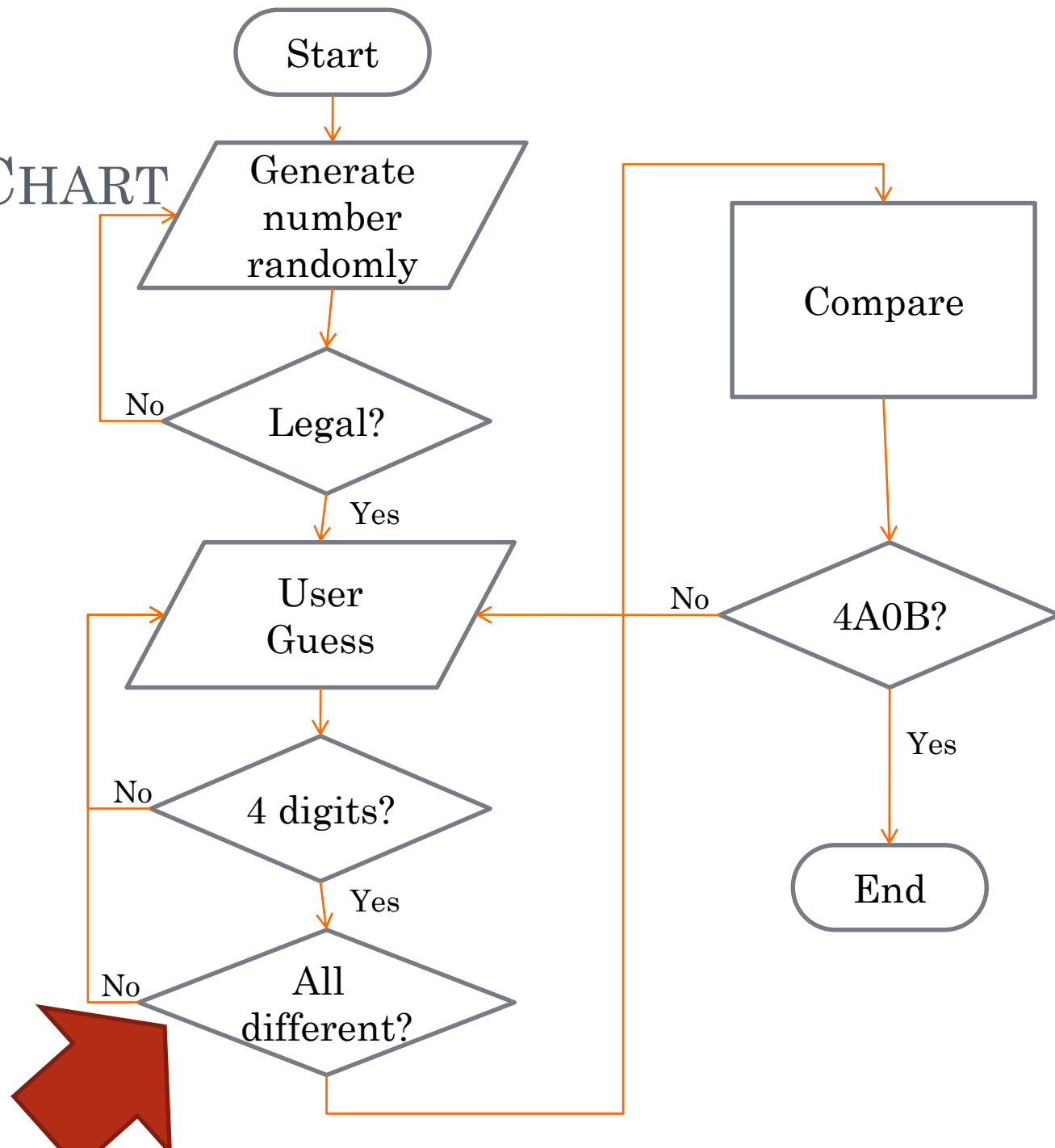
	0	1	2	3
Initial[]	1	0	0	0

Count = 0

END While!!!

	0	1	2	3
Initial[]	1	5	3	2

Count = 3

i=0

Flag=true

FLOW CHART

Start

Generate number randomly

Legal?

No

Yes

User Guess

4 digits?

No

Yes

All different?

No

Compare

4A0B?

No

Yes

End

DEMO

- Complier the example code, you will see as bellow

```
Please input 4 digit number:1122
1122:0A0B
Please input 4 digit number:_
```
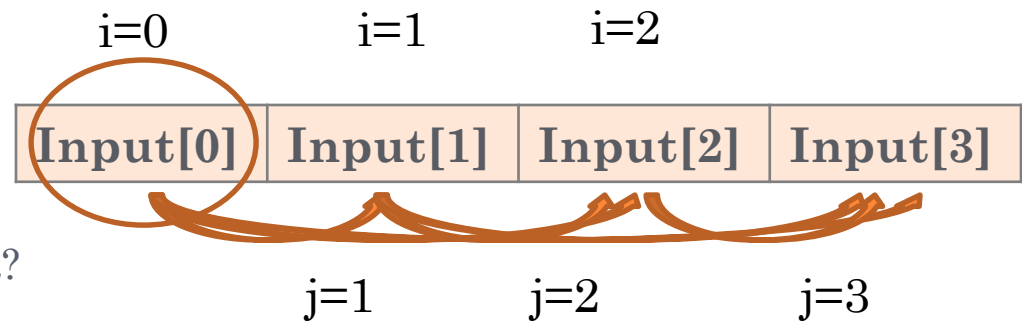
- It didn't tell you input error.
- Please ignore 0A0B.

- Normal

```
Please input 4 digit number:1122
1122:Input error! different please!
Please input 4 digit number:1234
1234:0A2B
Please input 4 digit number:_
```
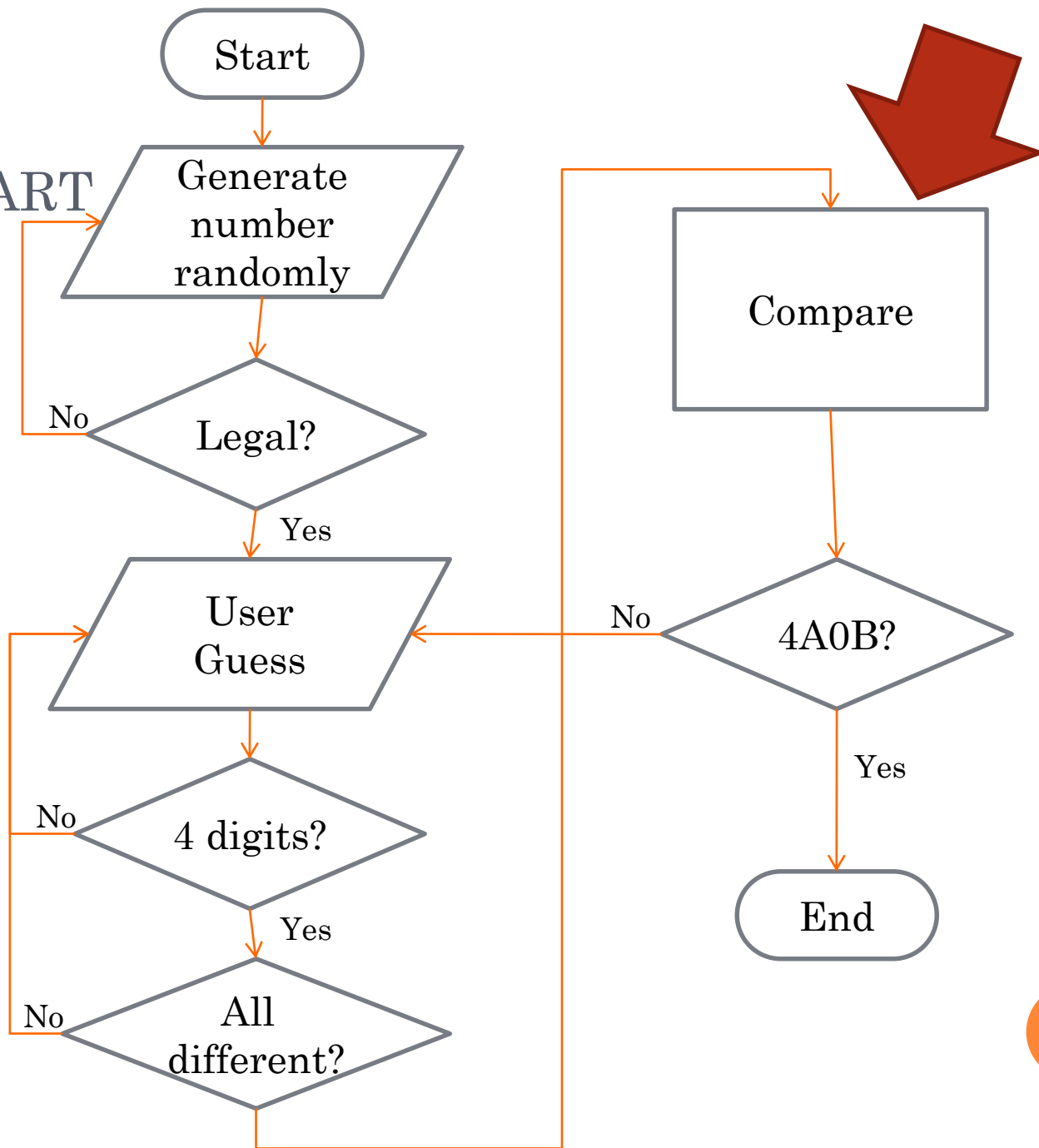
Input[0]	Input[1]	Input[2]	Input[3]

USER INPUT

ARE DIFFERENT FROM EACH OTHER?

j=1   j=2   j=3

```
47    //different?----------------------------------------------------
48    //you need to check that are input[0]~input[4] different from each other
49    //if input[i] eaque to input[j] and i is not j ,the value of different change to false
50    //please set the correct different value!!
51    bool different=true;
52    /*please fill this area*/
53
54
55    for(int i=0;i<3;i++)
56        for(int j=i+1;j<4;j++)
57            if(input[i]==input[j])
58                different=false;
59
60
61    /*end here*/
62    if(different==false)
63    {
64        cout<<"Input error! different please!\n";
65        continue;
66    }
```

FLOW CHART

Start

Generate number randomly

Legal? — No

Yes

User Guess

4 digits? — No

Yes

All different? — No

Compare

4A0B? — No

Yes

End

Demo

- Complier the example code, you will see as bellow

```
Please input 4 digit number:1234
1234:0A0B
Please input 4 digit number:5678
5678:0A0B
Please input 4 digit number:_
```

- It didn't compare answer with user input.

- Normal

```
Please input 4 digit number:1234
1234:0A2B
Please input 4 digit number:
```

COMPARE

```
63    //compare----------------------------------------------------------------
64    //now input[0]~input[3] is correct && we have initial[0]~initial[3]
65    //please compare input[] with initial[]
66    //if the position and the value are correct than A+1
67    //if the position is wrong but the value is correct then B+1
68    //How to get correct value of A and value of B?
69    int A=0,B=0;
70    /*please fill this area*/
71
72    for(int i=0;i<4;i++)
73        for(int j=0;j<4;j++)
74            if(input[i]==initial[j])
75            {
76                if(i==j)
77                    A++;
78                else
79                    B++;
80            }
81
82    /*end here*/
83    if(A!=4)//not correct
84        cout<<A<<"A"<<B<<"B\n";
85    else//Bingo! you are right!
86    {
87        cout<<"GREAT\n";
88        ans=true;//end~~
89    }
90    }
```

i=0	i=1	i=2	i=3
Input[0]	**Input[1]**	**Input[2]**	**Input[3]**

Initial[0]	**Initial[1]**	**Initial[2]**	**Initial[3]**
j=0	j=1	j=2	j=3

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