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**Repeated digits**

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When we write numbers down some (e.g., 11) have repeated digits, and others (e.g., 12) don't. Of course if we change the base in which we're writing numbers then that can affect whether or not a number has repeated digits. For instance, the decimal number 11:

Base	Number	Repeat
2	$1011_2$	Yes
3	$202_3$	Yes
4	$23_4$	No
...	...	...
9	$12_9$	No
10	$11_{10}$	Yes

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**Task**

- In base  $b$  is there a largest number without repeated digits? If so, what is it?
- Write a program which, given a base  $b$  and an integer  $n$  finds the longest block of integers all having repeated digits in base  $b$  that are less than  $n$ . The output should be the first integer of the block (in normal decimal representation) and the length of the block (if there is more than one block of the same length, the first one should be given.)

```
(command line) findblock 10 30  
(output) 11 1
```

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(command line) findblock 2 8  
(output) 3 5
```

- Write a program which, given two bases  $b$  and  $c$  finds the smallest integer  $n$  which has repeated digits in both bases.

(1 point, Individual)