Ug caveman. Ug real smart caveman. Ug invent many things. Ug invent spear. Ug invent fire (and escape with much hair left). Now Ug want invent wheel. Ug not know math. Ug never heard of circle. Ug not have good tools. But Ug not give up. Ug invent wheel if take Ug all day.

Ug want carve wheel out of "$N \times N$ square" stone. Ug want wheel be "convex", Ug hate vex. Ug want wheel be "4-way rotationally symmetric", Ug think that good bullet point. Ug not good with curve. Ug carve straight lines between "lattice points" only. Ug want wheel have much much "edges", so roll good.

Ug have Dual Core 3.2GHz Pentium D Linux Box but Ug not know how program. Help Ug make wheel with most "edges".

Input

Ug have at most 20 blocks, Ug want carve one wheel from each block. Ug give size N of each block on one line. N no more than 100000. After Ug done, Ug give 0 on line.

Output

Block have "coordinates from (0,0) to (N, N)". Tell Ug "vertices in counterclockwise order, starting on the x-axis" where Ug carve to make "convex 90-degree rotationally symmetric polygon" with "maximum number of edges". (Ug hope big words make wheel roll good!) Maybe many possible wheel, Ug accept all. Give Ug blank line after each wheel.

Sample Input

```
1
3
0
```

Sample Output

```
(0,0)
(1,0)
(1,1)
(0,1)

(1,0)
(2,0)
(3,1)
(3,2)
(2,3)
(1,3)
(0,2)
(0,1)
```