COM S 327, Spring 2023
Programming Project 0
The Knight's Tour

See this Wikipedia article about the Knight's Tour problem: http://en.wikipedia.org/wiki/Knight%27s_tour.

Finding all directed, open tours on a standard, 8×8 chessboard is computationally intractable. To find them all on a 7×7 board in reasonable time would require a supercomputer. My quick-and-dirty solution finds all 6×6 solutions in 127 minutes 52 seconds and all 5×5 tours in under 0.6 seconds on a laptop.

Write a C program to find all directed, open Knight's Tours on a 5×5 chess board. Assume the spaces of the board are numbered:

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25

Print all tours as a list of numbers corresponding to the spaces in the order they are visited. For instance, here is one solution:

```
25,18,21,12,23,20,9,2,11,22,19,10,13,16,7,4,15,24,17,6,3,14,5,8,1
```

There are 1727 others.

See the syllabus for information about what to turn in and submission format.

Extra Challenges (nothing below this line is required)

- Generalize your program to handle boards of arbitrary dimension $x \times y$.
- Generalize your program to handle boards on a cylinder.
- Generalize your program to handle boards on a torus.
- Generalize your program to handle arbitrary boards (a graph with rectilinearly connected nodes).
- Find only the subset of tours which are unique under rotation and reflection.
- Print a board with the spaces numbered by the order in which they are visited. For instance, here is the board corresponding with the solution given above:

```
25  8 21 16 23
20 15 24  7 12
 9  4 13 22 17
14 19  2 11  6
 3 10  5 18  1
```

- Generate graphical representations of your tours. For instance, I used METAPOST to generate an image of the tour above and one on a full 8×8 board: