The University of Western Australia
Dept. of Electrical & Electronic Engineering
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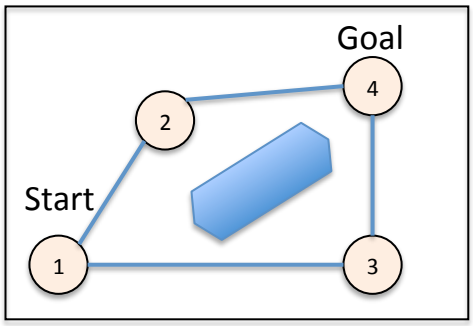
Mobile Robots
AUTO4508

Lab Assignment 6 – *Group* – A-Star **Points: 10**

EXPERIMENT 1 (5 points)

Read the (x, y) coordinates in mm for up to 20 nodes from file: `nodes.txt`
Following each set of coordinates is the connectivity list to other nodes, as not every node is reachable from every other node (e.g. blocked by obstacles).
Start node is the first node, **goal node** is the last node in the file. Coordinate origin [0,0] is bottom left.



Example file matching the drawing above:

```
100  100  2 3      // Node 1 (Start):  x = 100, y = 100, has links to nodes 2 and 3
200  400  1 4      // Node 2:          x = 200, y = 400, has links to nodes 1 and 4
700  100  1 4      // Node 3:          x = 700, y = 100, has links to nodes 1 and 4
700  500  2 3      // Node 4 (Goal):   x = 700, y = 500, has links to nodes 2 and 3
```

For debugging purposes print the connection matrix after reading the input file.
If two nodes are not connected, print "–1".

Distance output for example (no connection = -1):

```
  0.0   316.2   600.0    -1.0
316.2     0.0    -1.0   509.9
600.0    -1.0     0.0   400.0
 -1.0   509.9   400.0     0.0
```

EXPERIMENT 2 (3 points)

Calculate the A* algorithm from **starting node 1** to **goal node** (4 in this example)

- Use the Euclidian distance as lower bound to goal as well as the actual driving distance (if reachable)
- Print the **shortest path and distance** from start to goal.

EXPERIMENT 3 (2 points)

Drive the robot in the given environment along the shortest calculated path.