Recall 4 kinds of critical events:

1) appear
2) disappear
3) split
4) merge

Imagine a "movie" where gaps shows up.

A derived I-space that records only the sequence of cyclic orderings of gaps:

\[
\begin{align*}
\text{cyclic} & \quad \text{compress this into a tree}\n\end{align*}
\]

Make an even smaller I-space.
Consider the 4 critical events:

1) appear:  
   - New node, attached to root
   - New label

2) disappear:  
   - Delete node

3) merge

4) split

Shows the "merge structure"
Consider growing a tree that “represents” the whole environment/configuration.

Initially:

- Square denotes primitive node
- Cannot split

Modify the tree at the critical events:

For an appear event, the new node is called primitive.
'Learn' the environment/configuration

Keep chasing nonprimitive gaps/nodes
(any branch that has at least
one non-primitive leaf node)

If a split occurs, chase a non-primitive child
If a disappear occurs, chase a different non-primitive
node.

If all leaves are primitive, then
we are done exploring.
What is it good for? The robot can navigate optimally, in terms of shortest possible Euclidean distance travelled.

**Objects in the environment**

- Chase(object)
  - No distances or angles
  - Unknown whether E is polygonal or smooth
  - Big or Small?

\[ X(\mathcal{H}) \subseteq X = \mathbb{R}^2 \times \mathbb{S}^1 \times \mathcal{E} \]

Sec. 6.2.4
July? June?

Can we learn about the state with no sensors?

Actuation only

Project Teams?

(Olli, Timo)

Umeå - individual projects: Erik, Ola, Kalle
Markus
Tero
Reijo, Lassi
Nazia