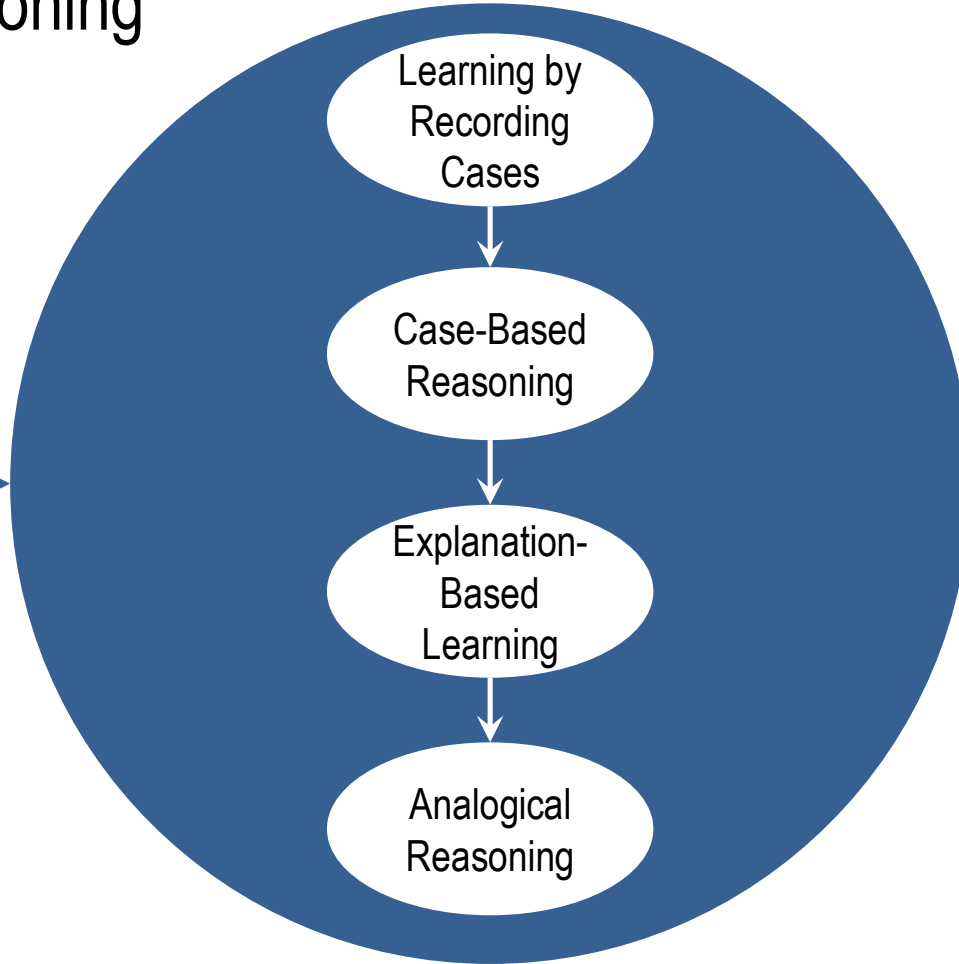




Case-Based Reasoning

Analogical Reasoning



Lesson Preview

- Need for case-based reasoning
- Case adaptation, evaluation, and storage
- Case retrieval revisited
- Advanced case-based reasoning

Block World

Red

Orange

Blue

Black

Green

Purple

What color is this block?

?

Orange

Block World

Red

Orange

Blue

Black

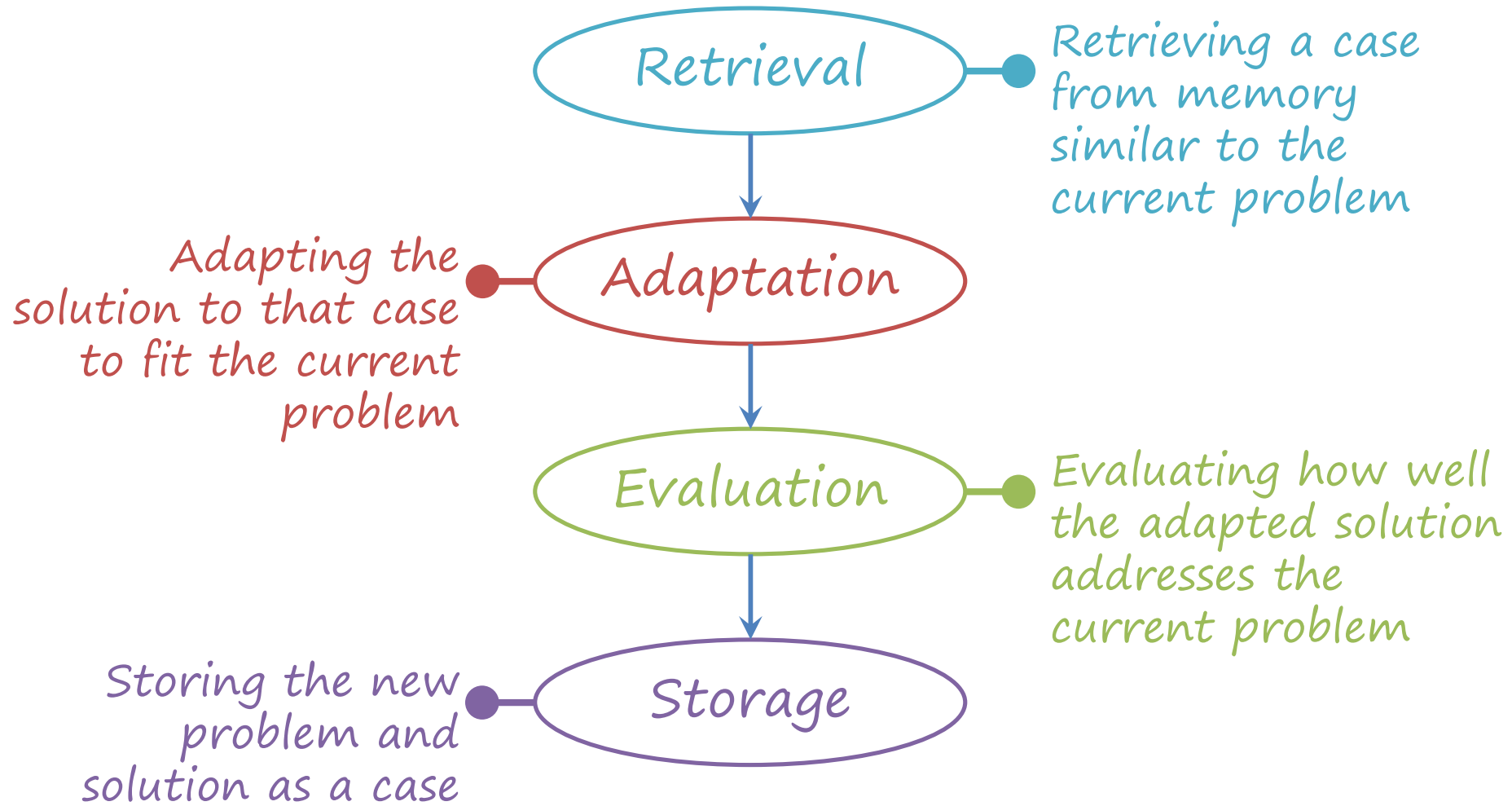
Green

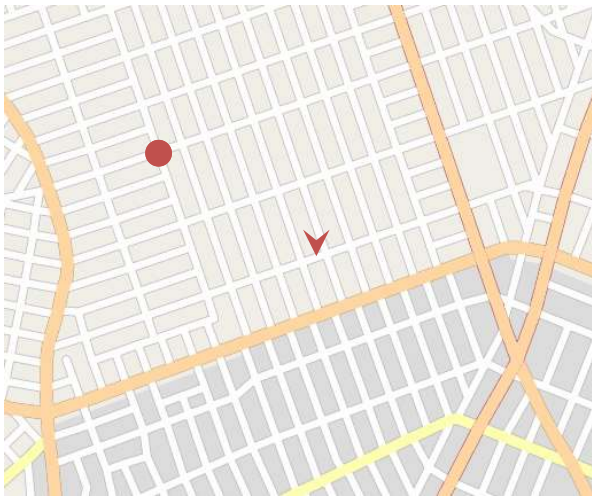
Purple

What color is this block?



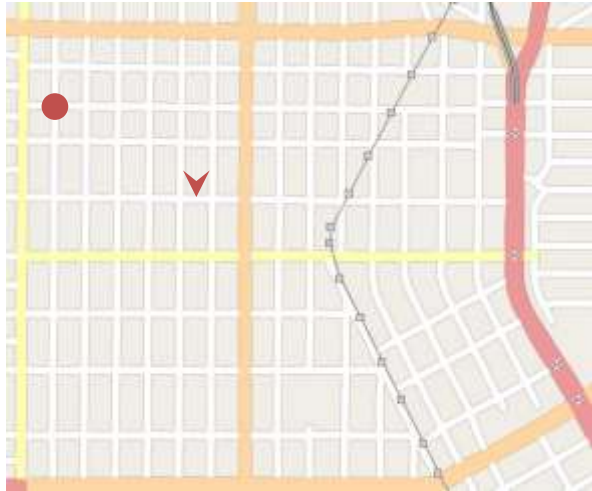


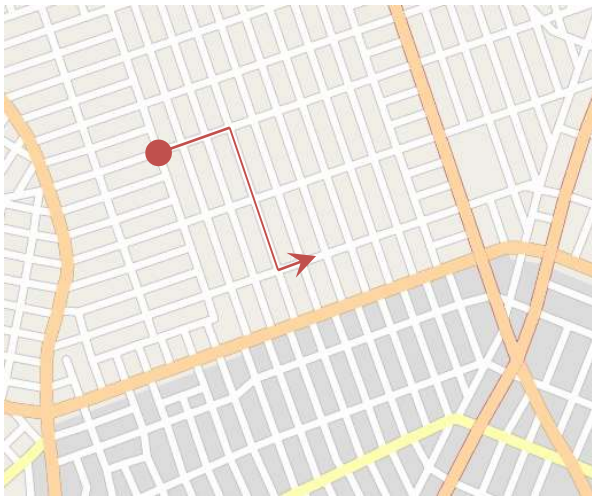




Assumptions of Case-Based Reasoning

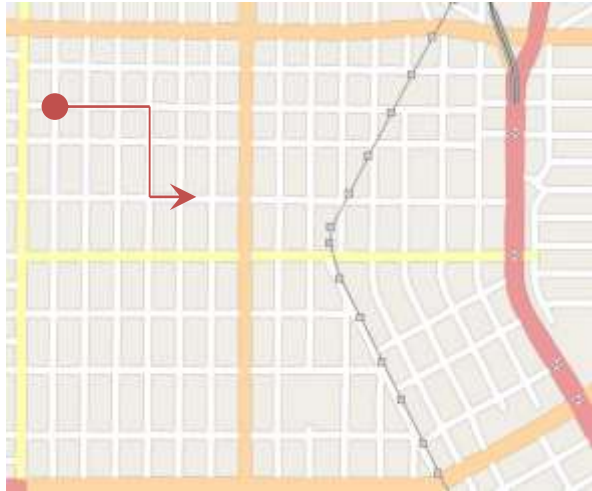
- Patterns exist in the world
- Similar problems have similar solutions

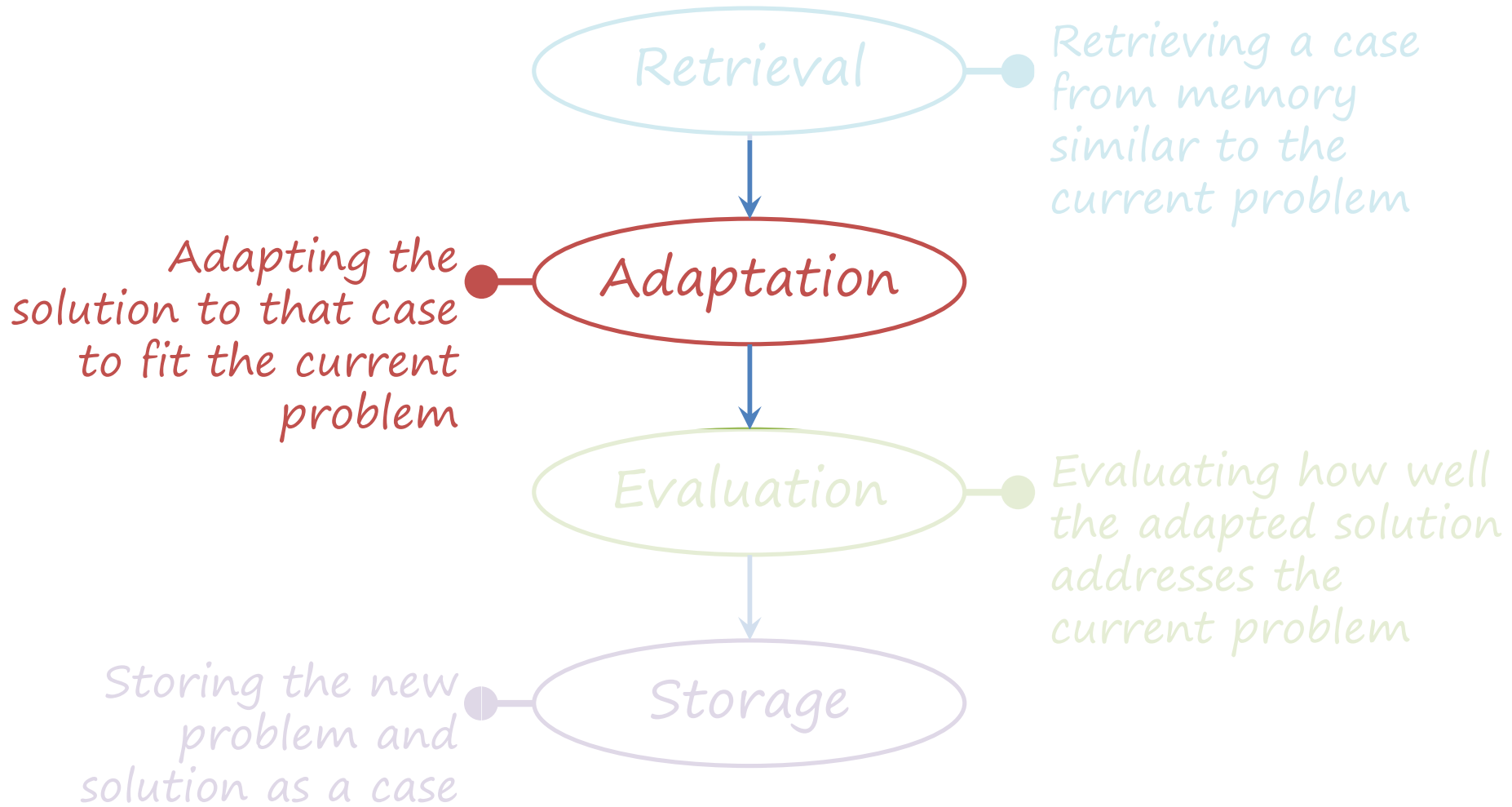


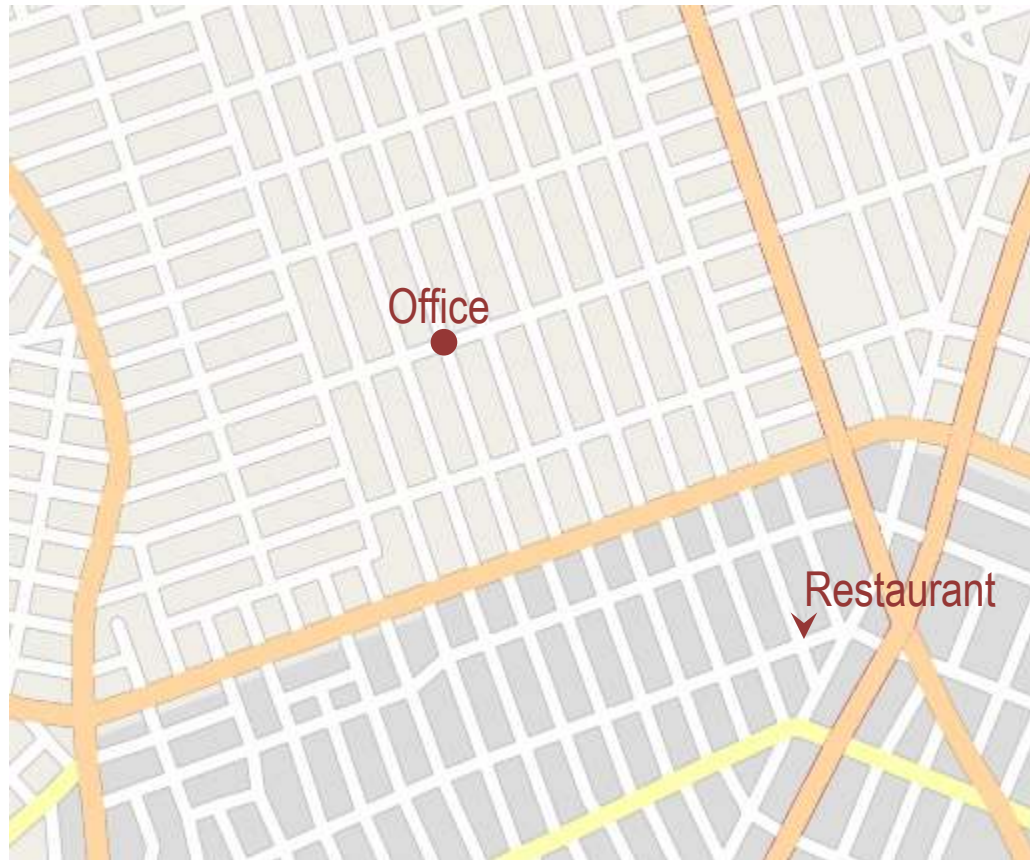


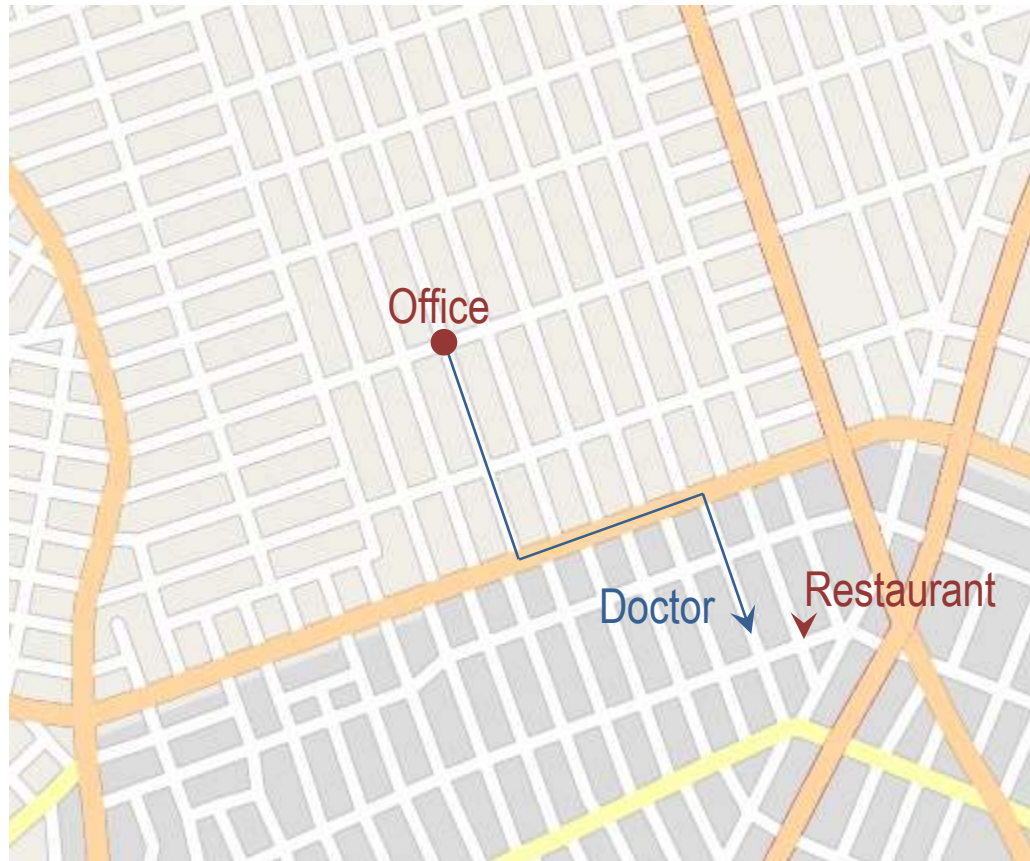
Assumptions of Case-Based Reasoning

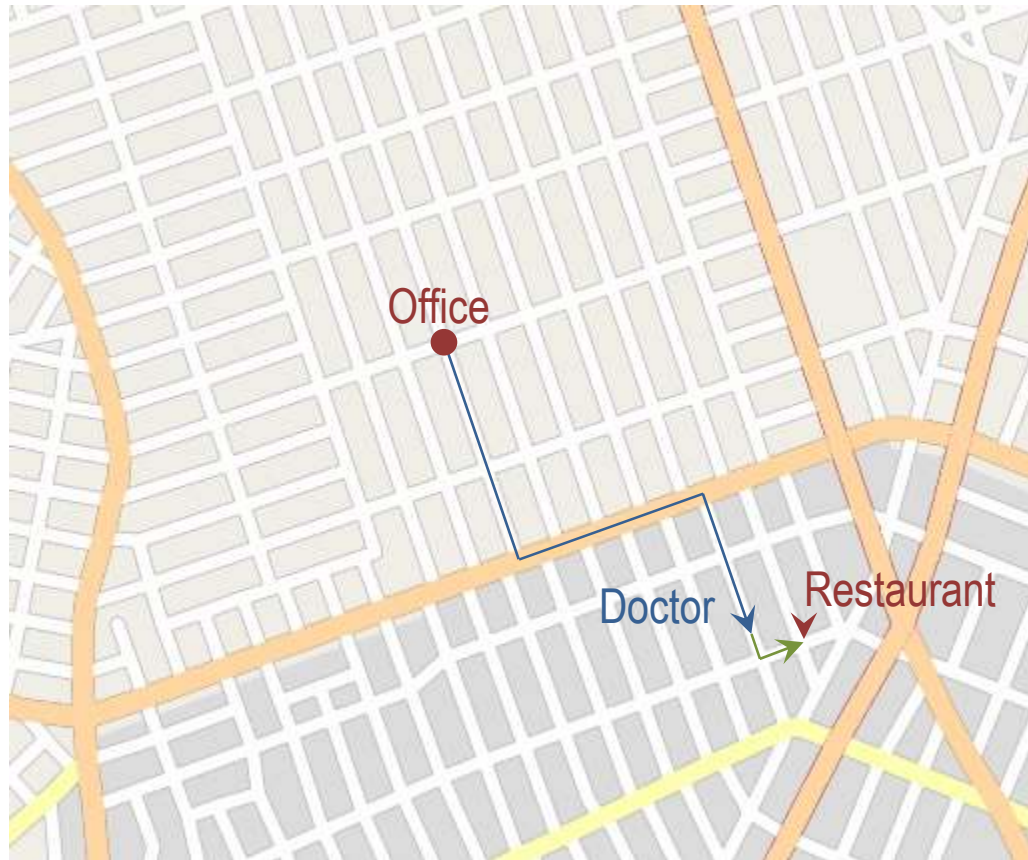
- Patterns exist in the world
- Similar problems have similar solutions

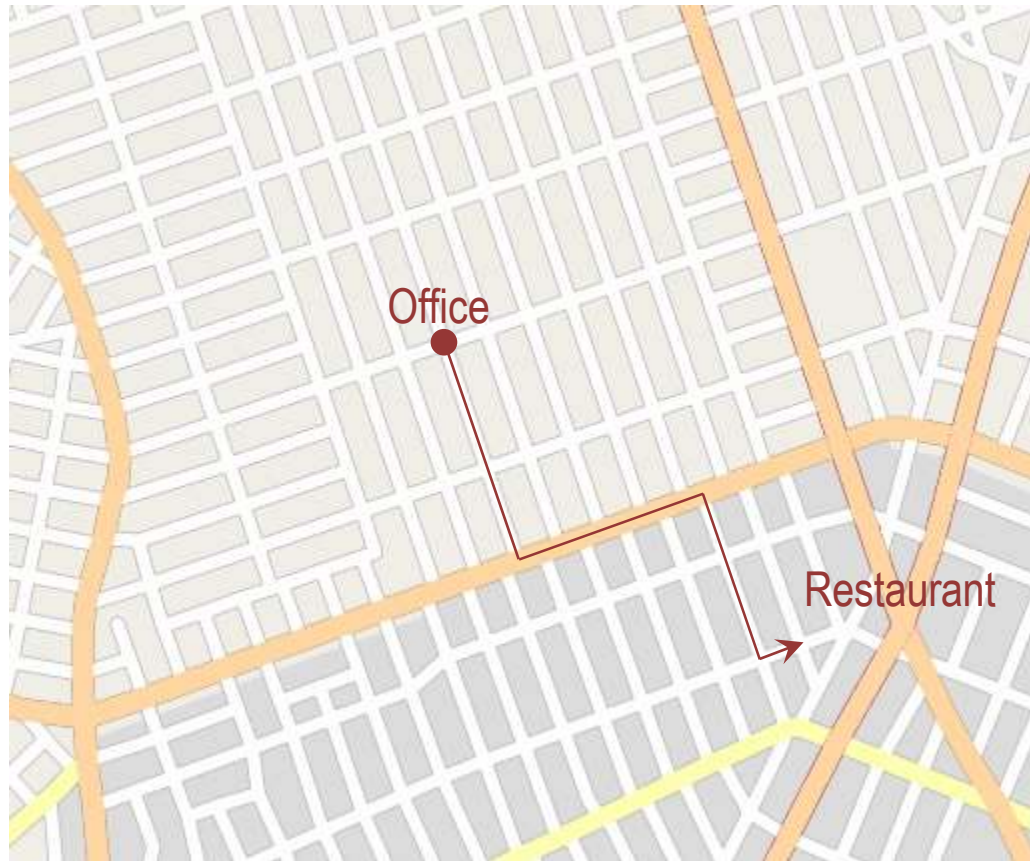


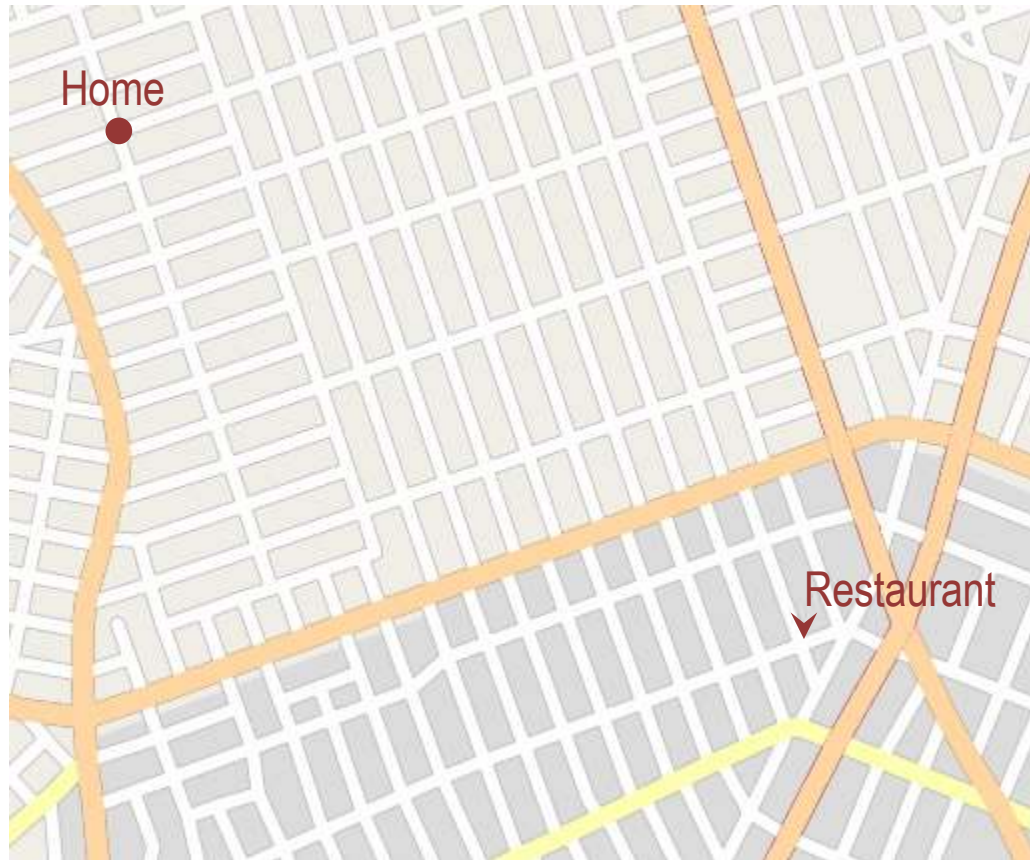


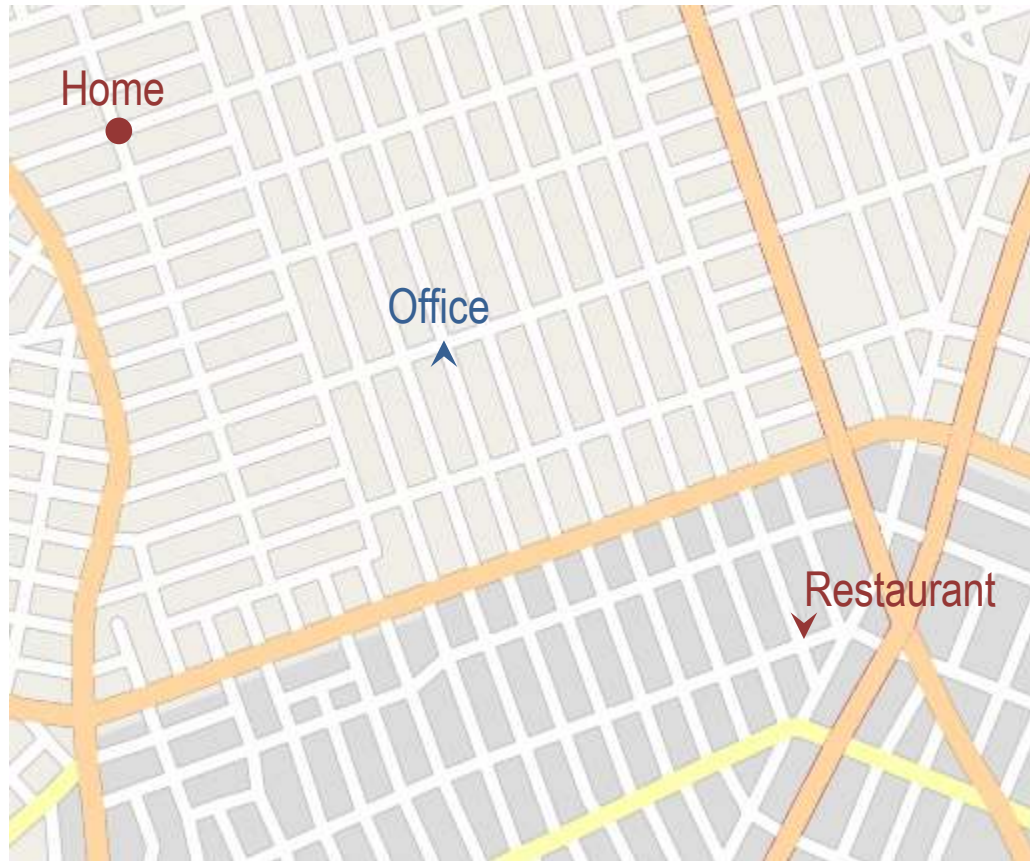


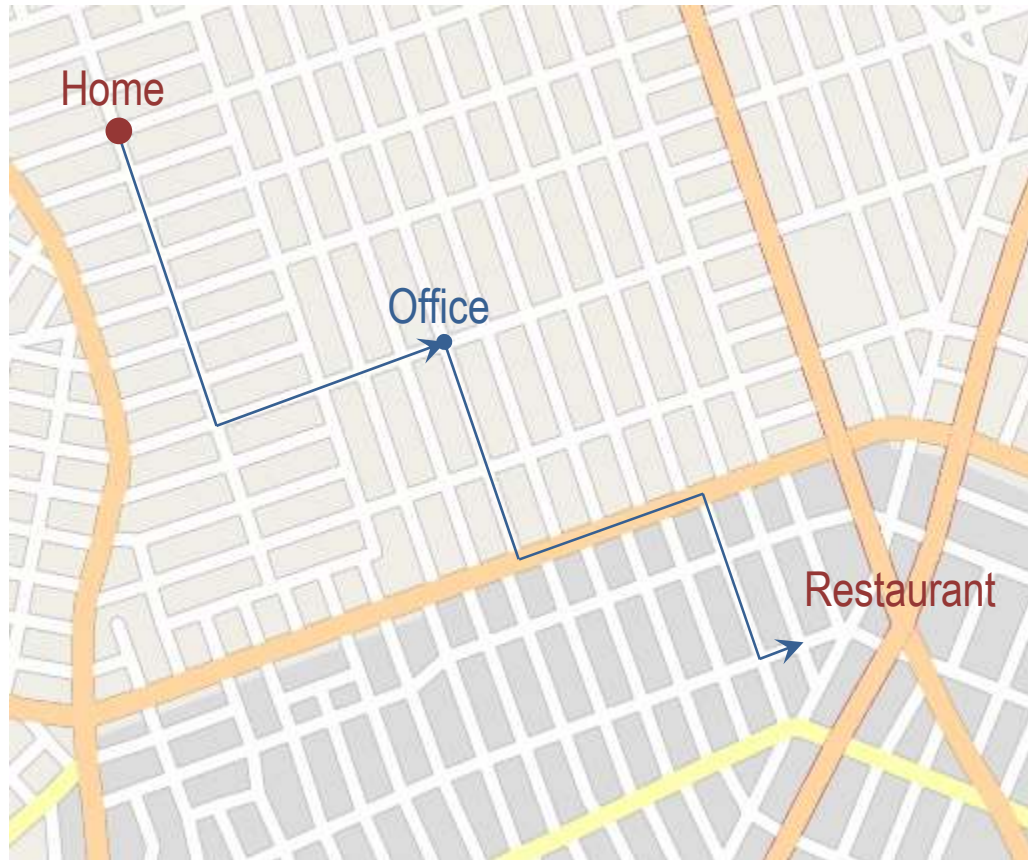




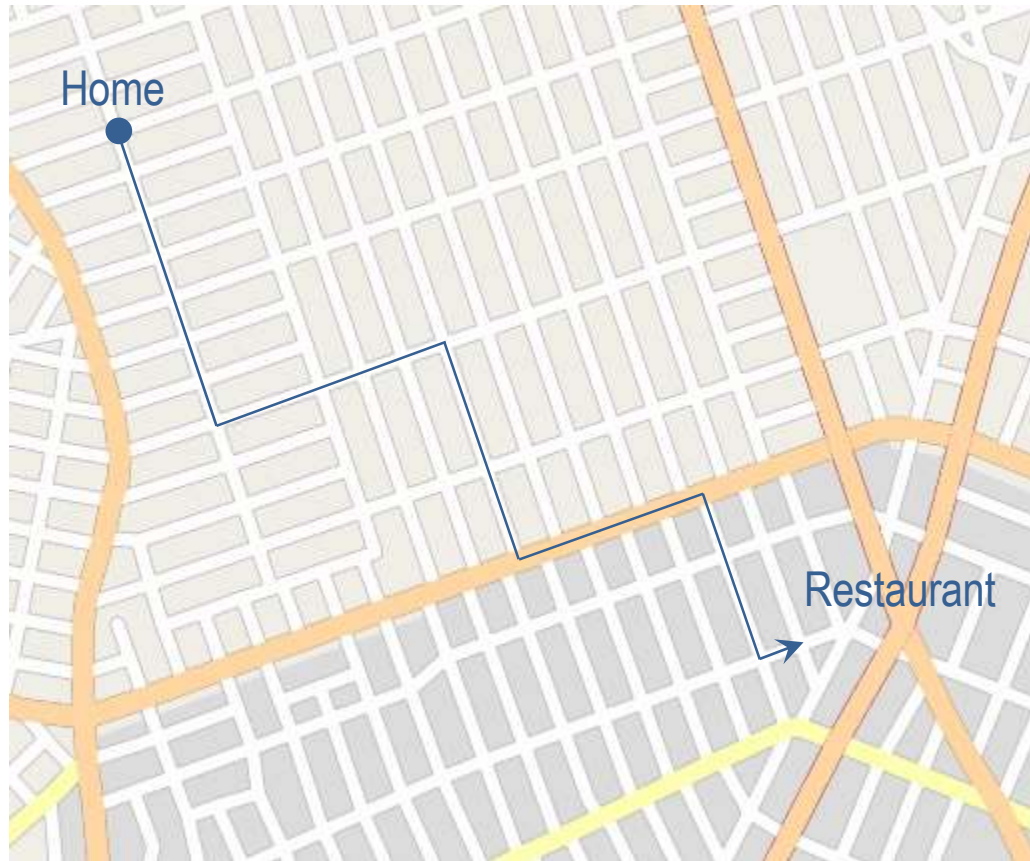




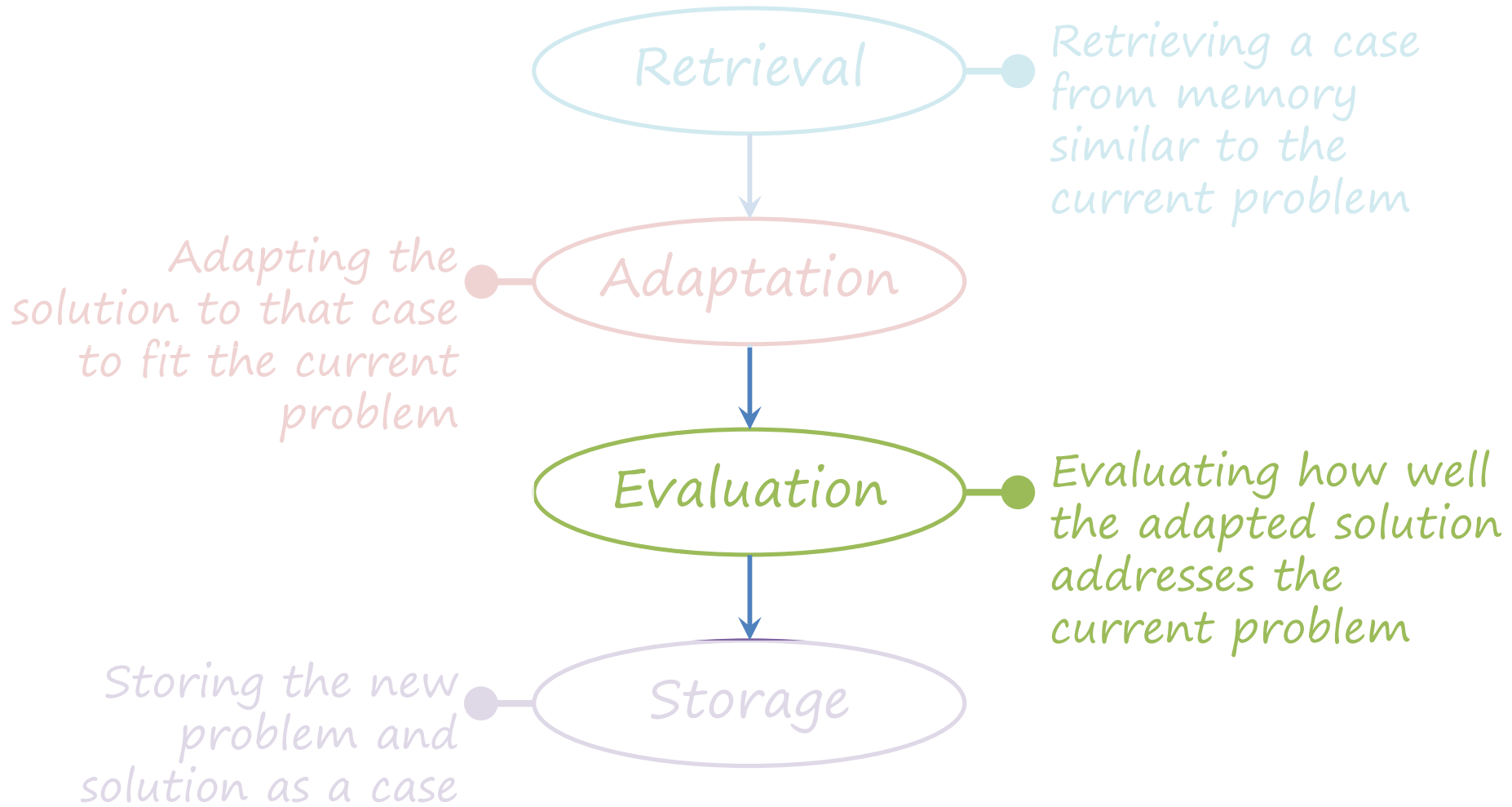






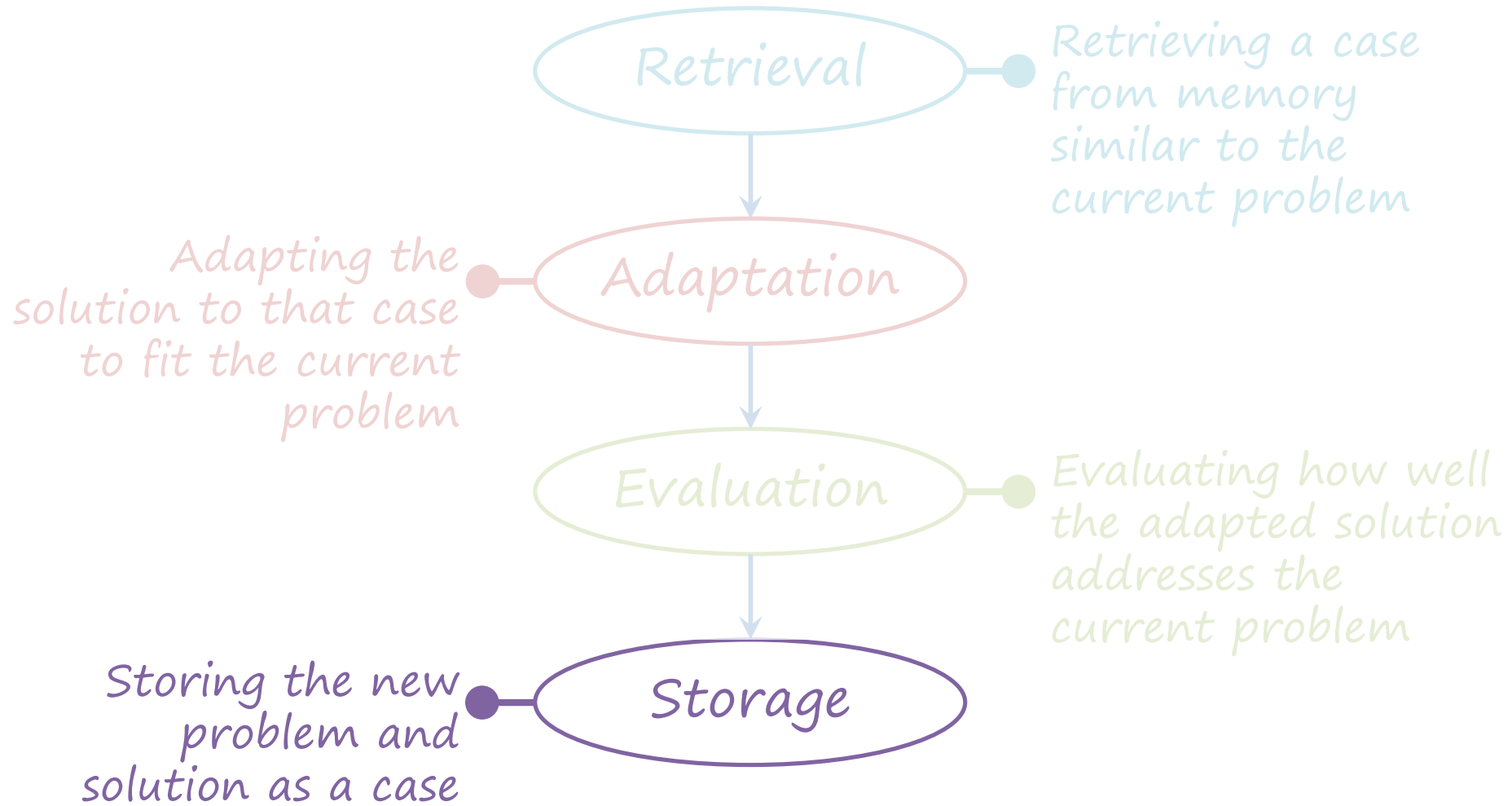


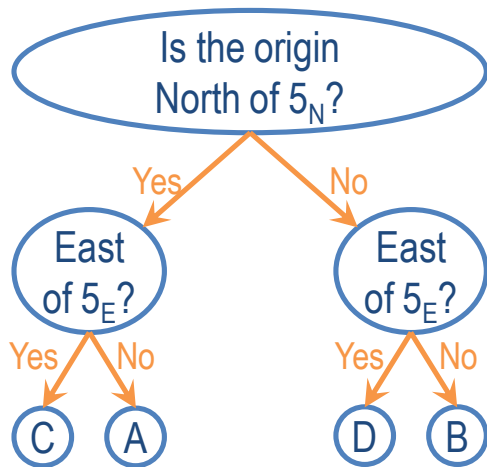


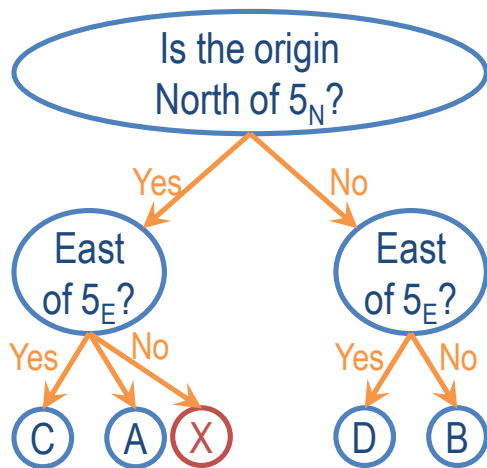


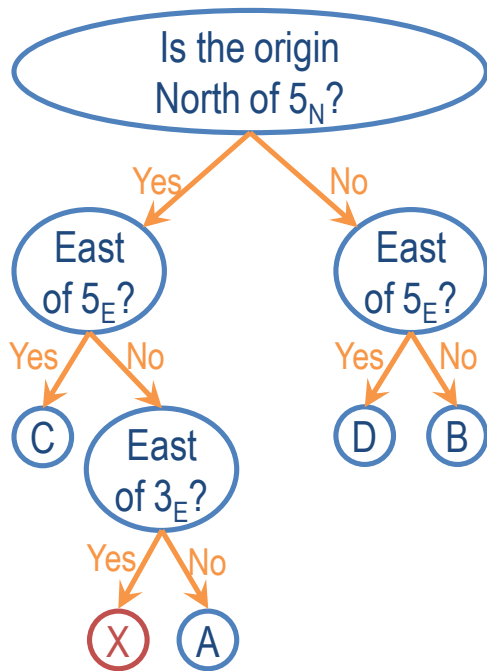


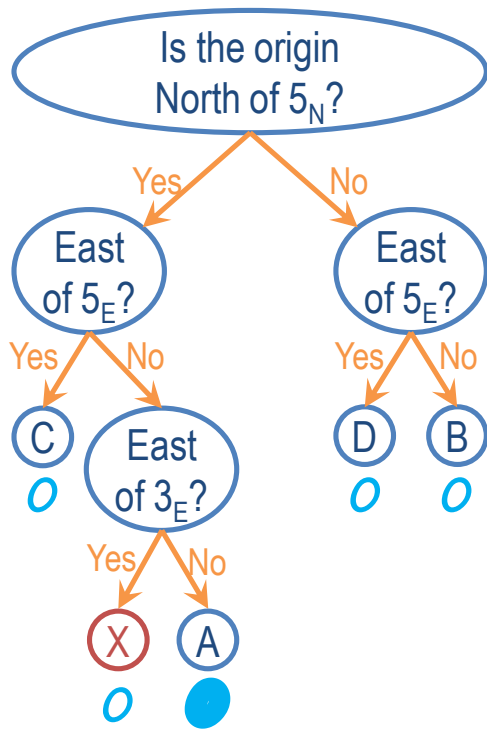








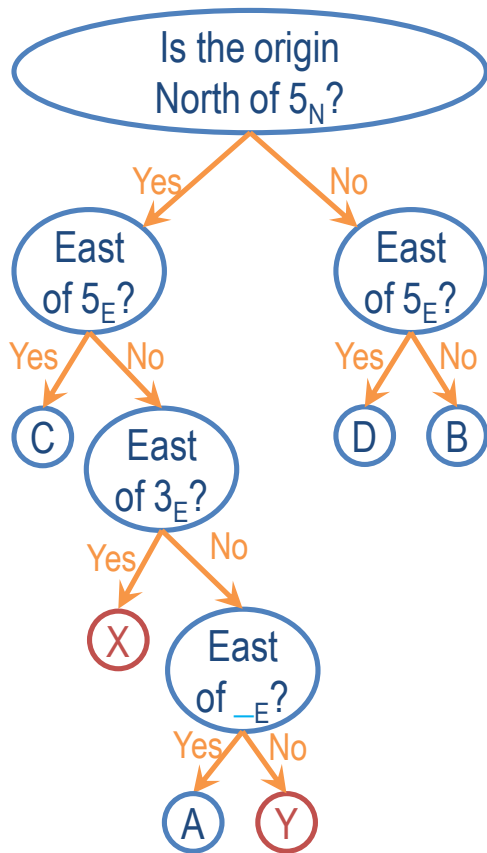




*Under which branch should
case Y be stored?*

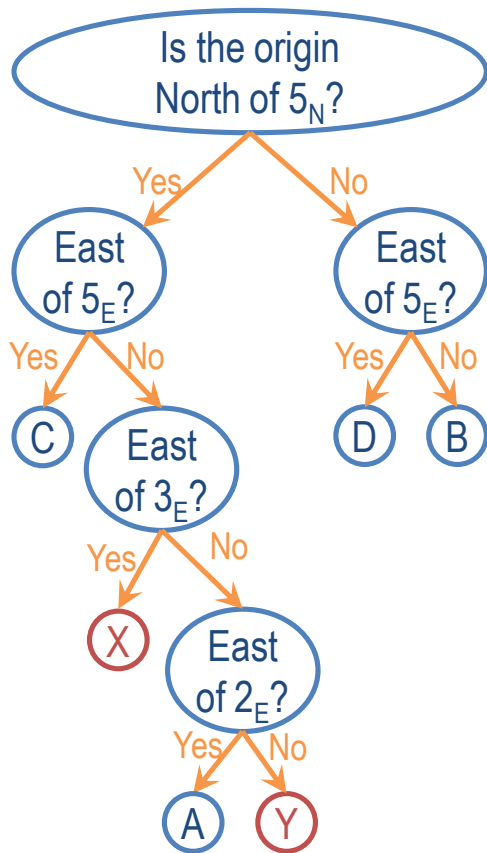






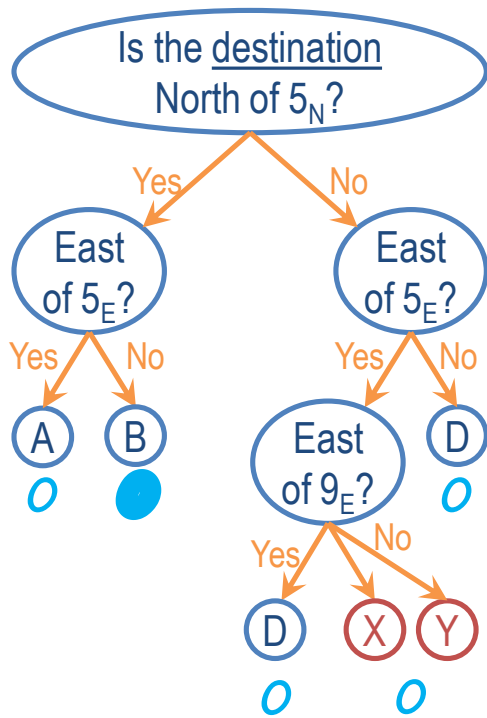
Where should this branch be divided for maximum differentiation?





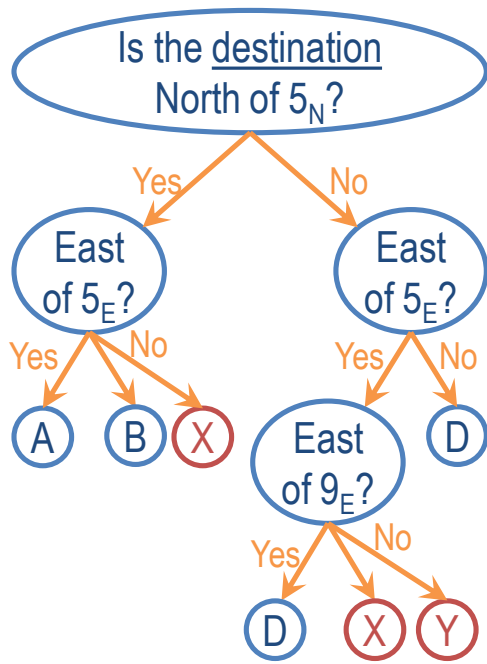
Where should this branch be divided for maximum differentiation?





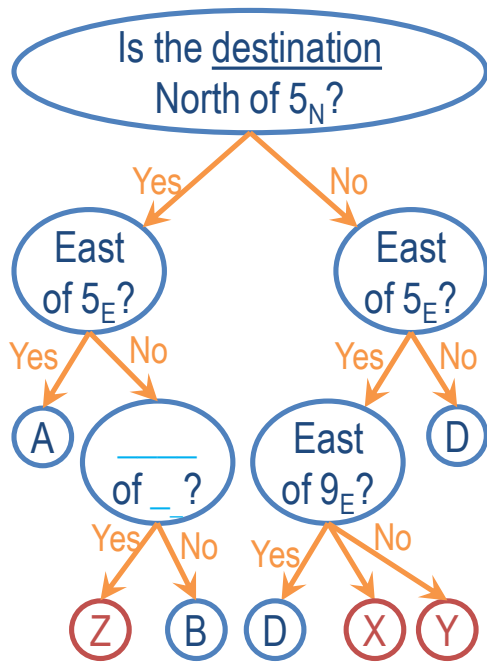
Under which branch will case Z be stored?





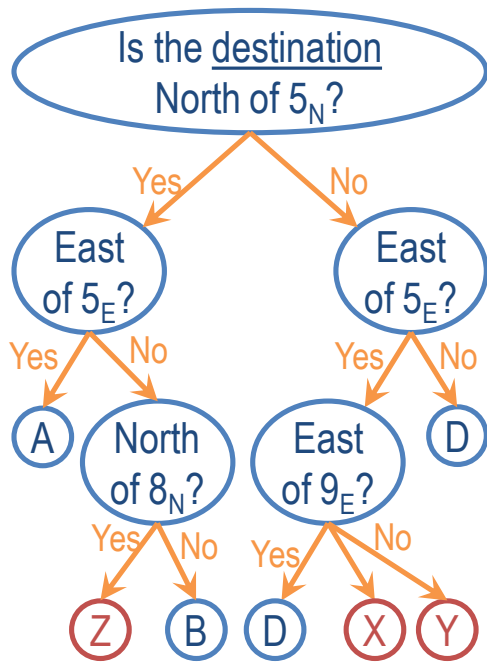
Under which branch will case Z be stored?





Where should this branch be divided for maximum differentiation?

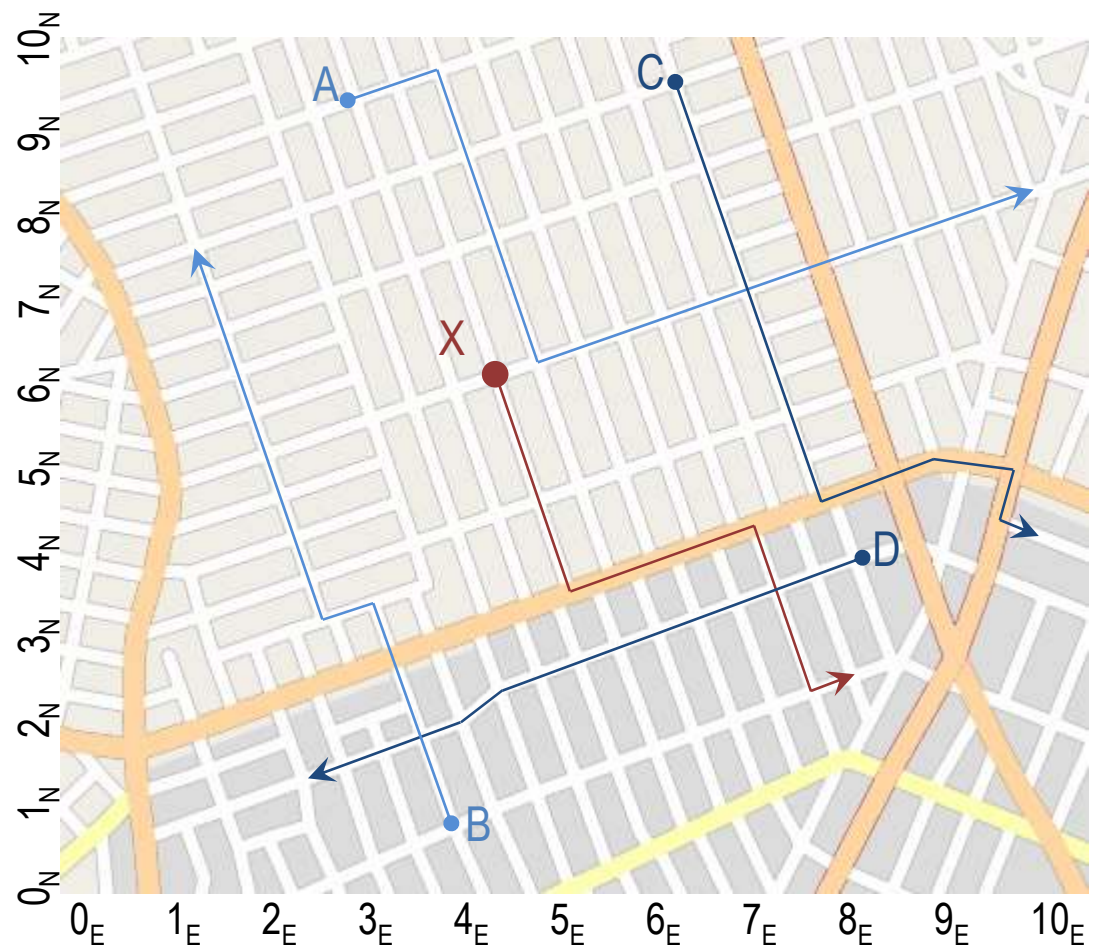




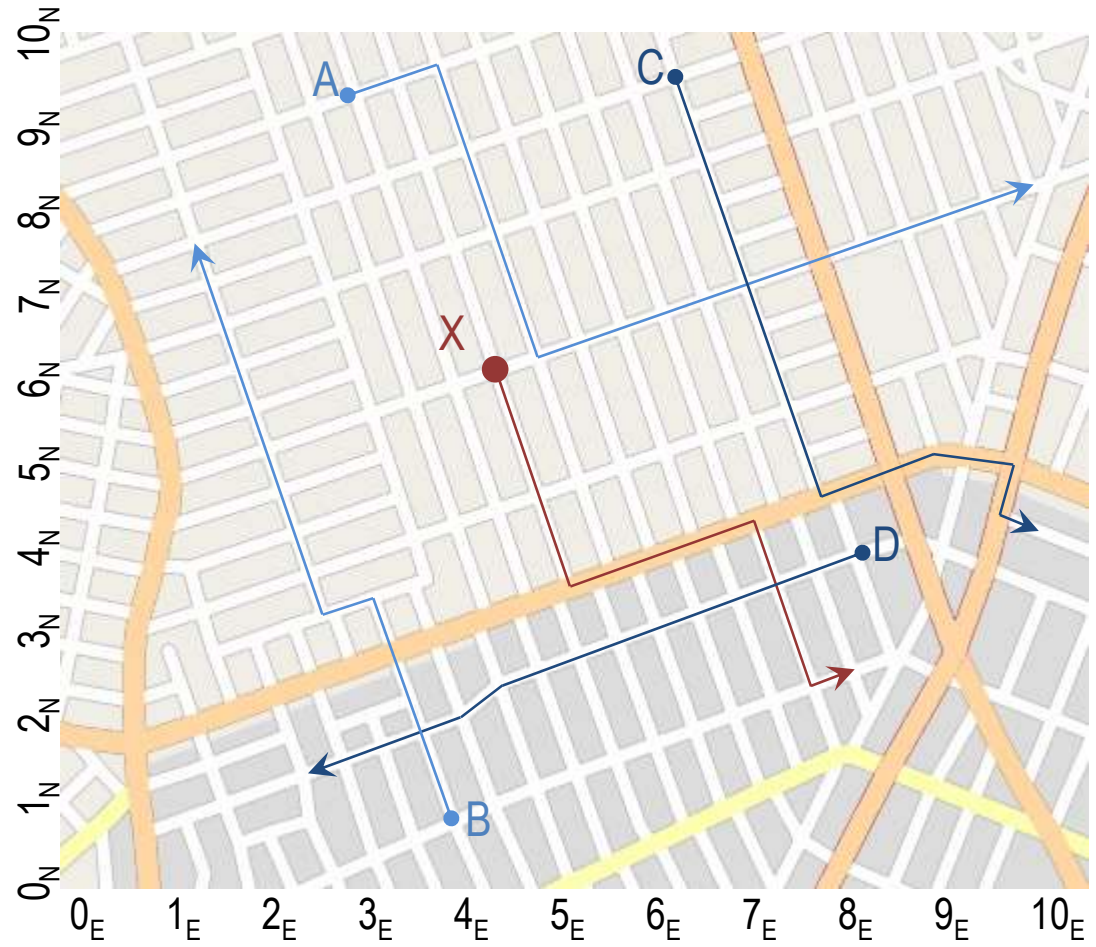
Where should this branch be divided for maximum differentiation?



Route	Origin _x	Origin _y
A	3 _E	9 _N
B	4 _E	1 _N
C	7 _E	9 _N
D	8 _E	4 _N



Route	Origin _x	Origin _y
A	3 _E	9 _N
B	4 _E	1 _N
C	7 _E	9 _N
D	8 _E	4 _N
X	4 _E	6 _N



Route	Origin _x	Origin _y
A	3 _E	9 _N
B	4 _E	1 _N
C	7 _E	9 _N
D	8 _E	4 _N
X	4 _E	6 _N
Y	1 _E	9 _N

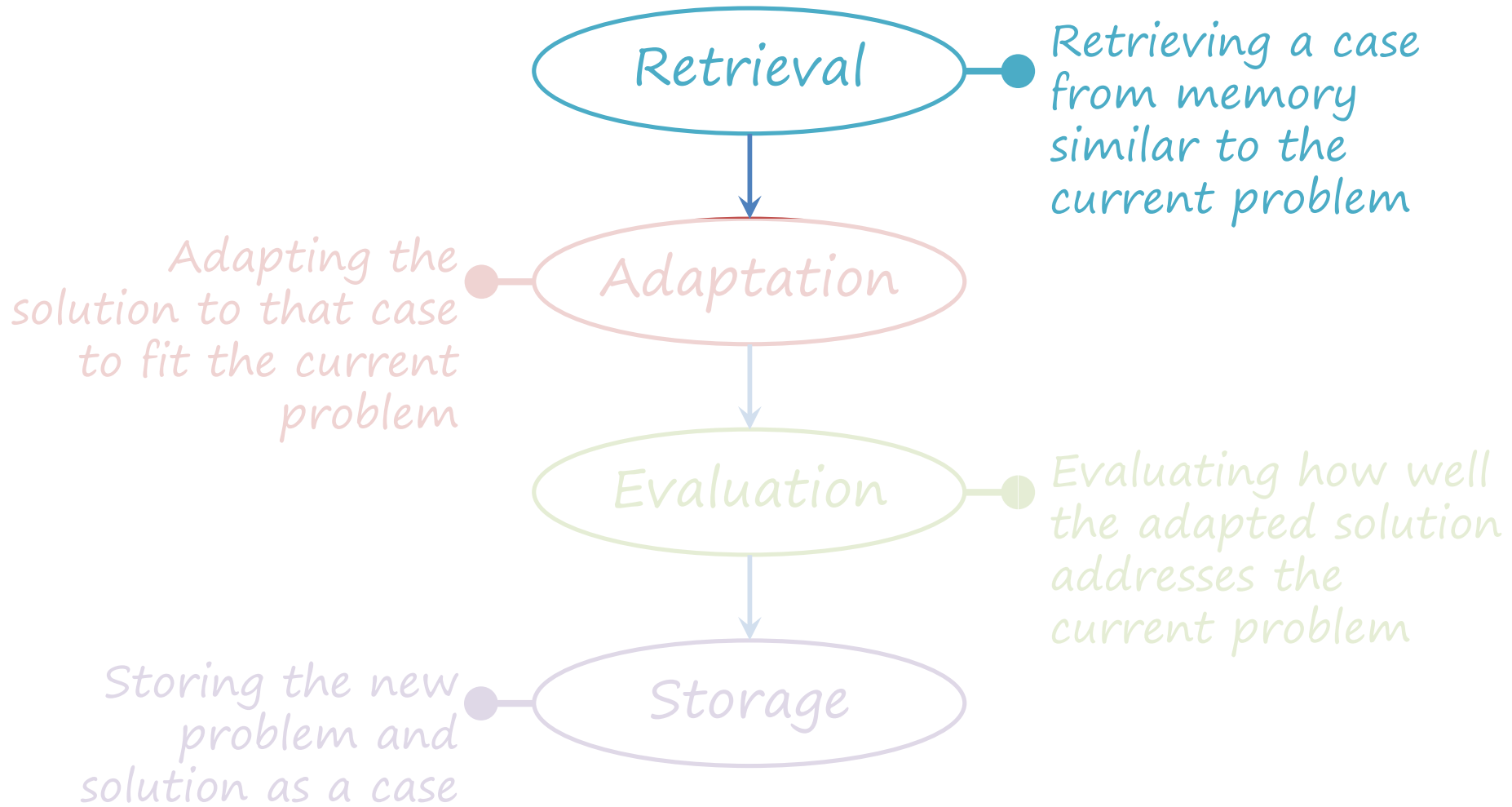
What tags should be used for case Y?



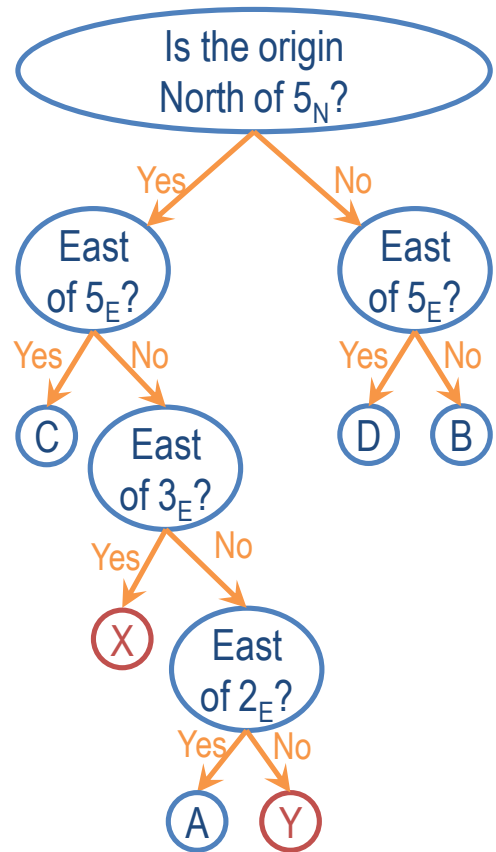
Route	Destination _x	Destination _y
A	10 _E	8 _N
B	1 _E	8 _N
C	10 _E	4 _N
D	2 _E	1 _N
X	8 _E	2 _N
Y	8 _E	2 _N
Z	1 _E	9 _N

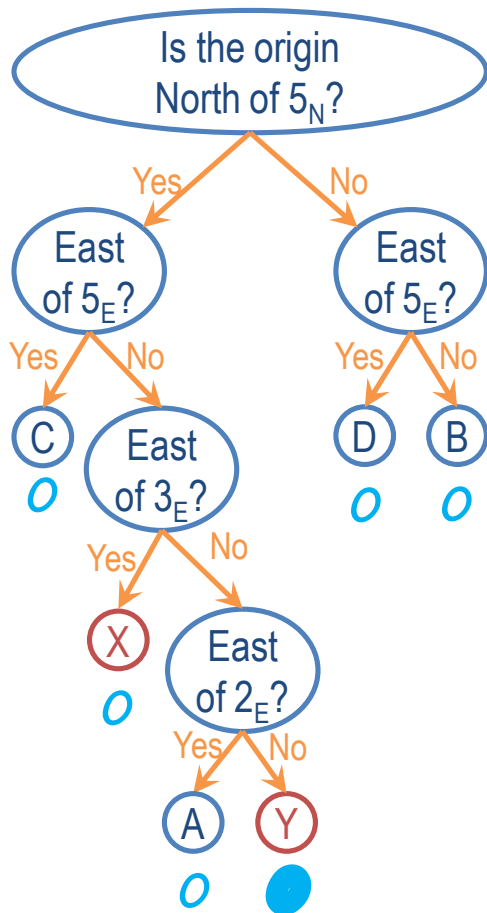
What tags should be used for case Z?



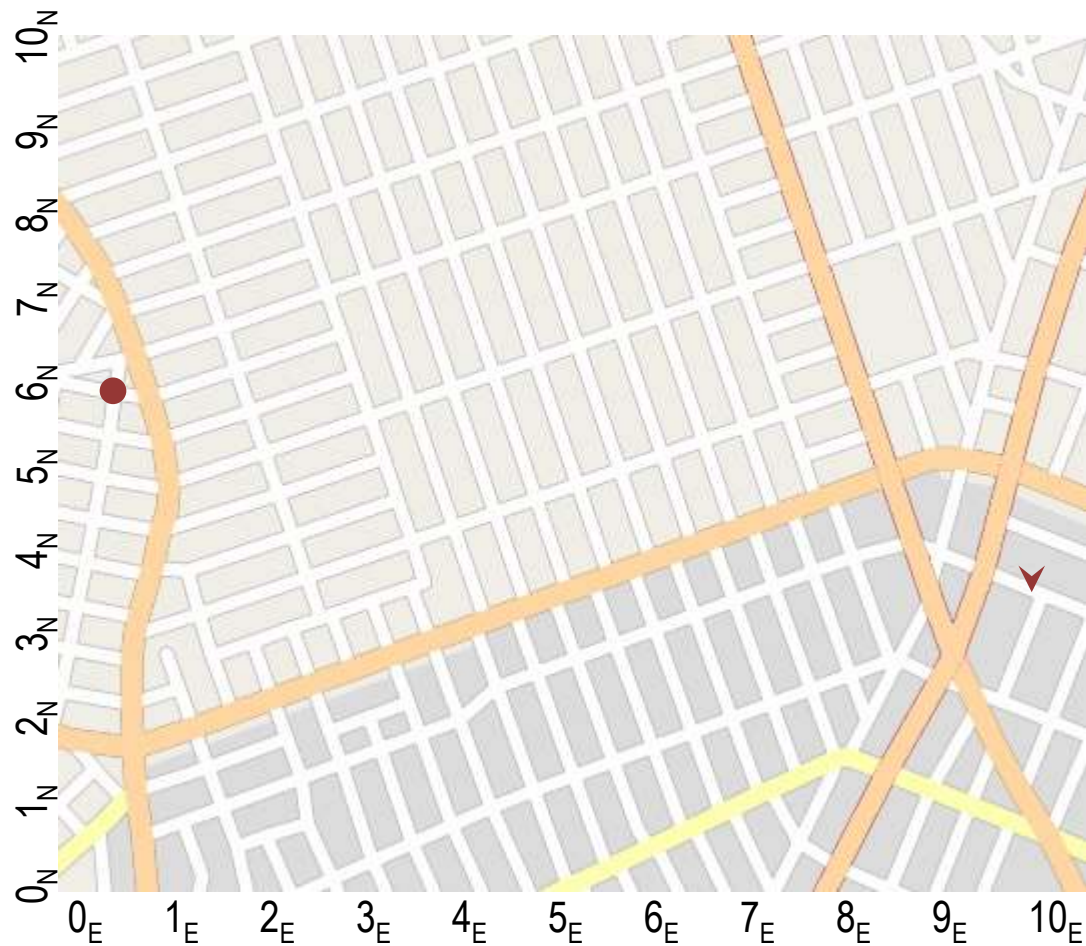


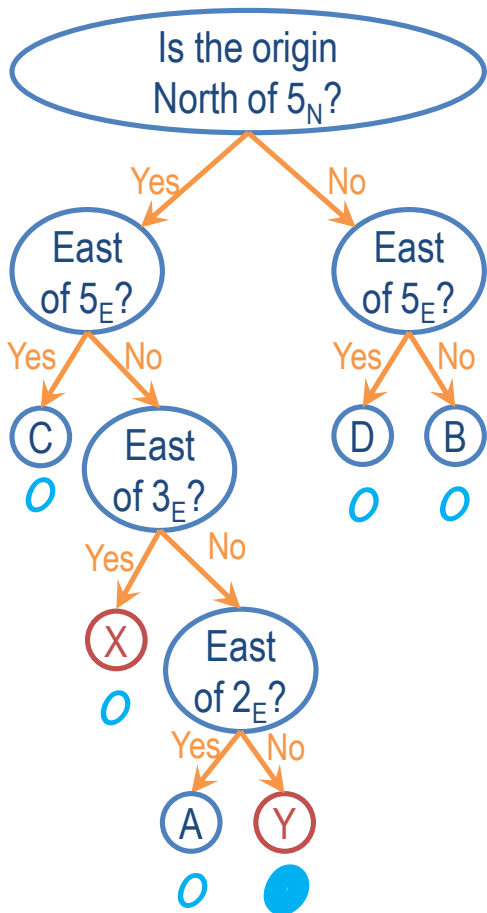
Route	Destination _X	Destination _Y
A	10 _E	8 _N
B	1 _E	8 _N
C	10 _E	4 _N
D	2 _E	1 _N
X	8 _E	2 _N
Y	8 _E	2 _N
Z	1 _E	9 _N












What case should be retrieved and adapted?












What case should be retrieved and adapted?



Route	Destination _x	Destination _y
 A	10 _E	8 _N
 B	1 _E	8 _N
 C	10 _E	4 _N
 D	2 _E	1 _N
 X	8 _E	2 _N
 Y	8 _E	2 _N
 Z	1 _E	9 _N

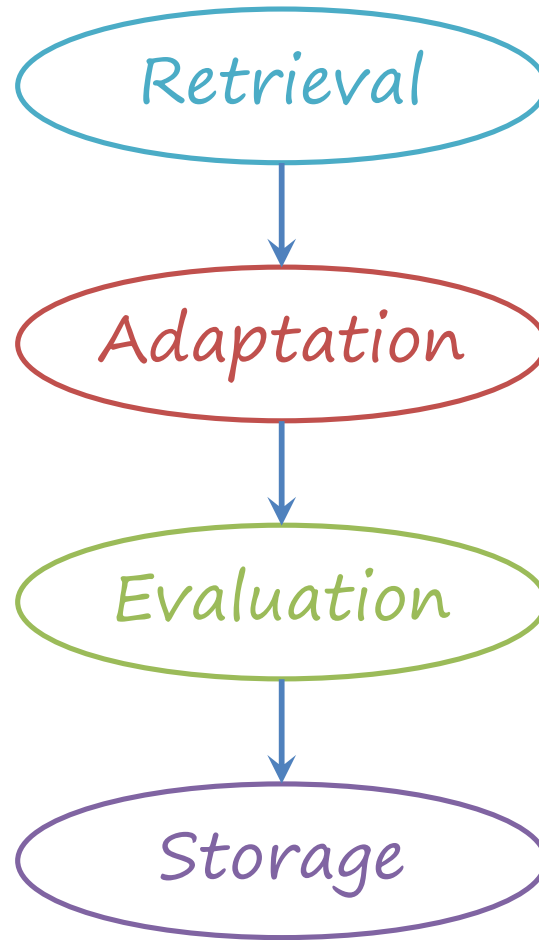


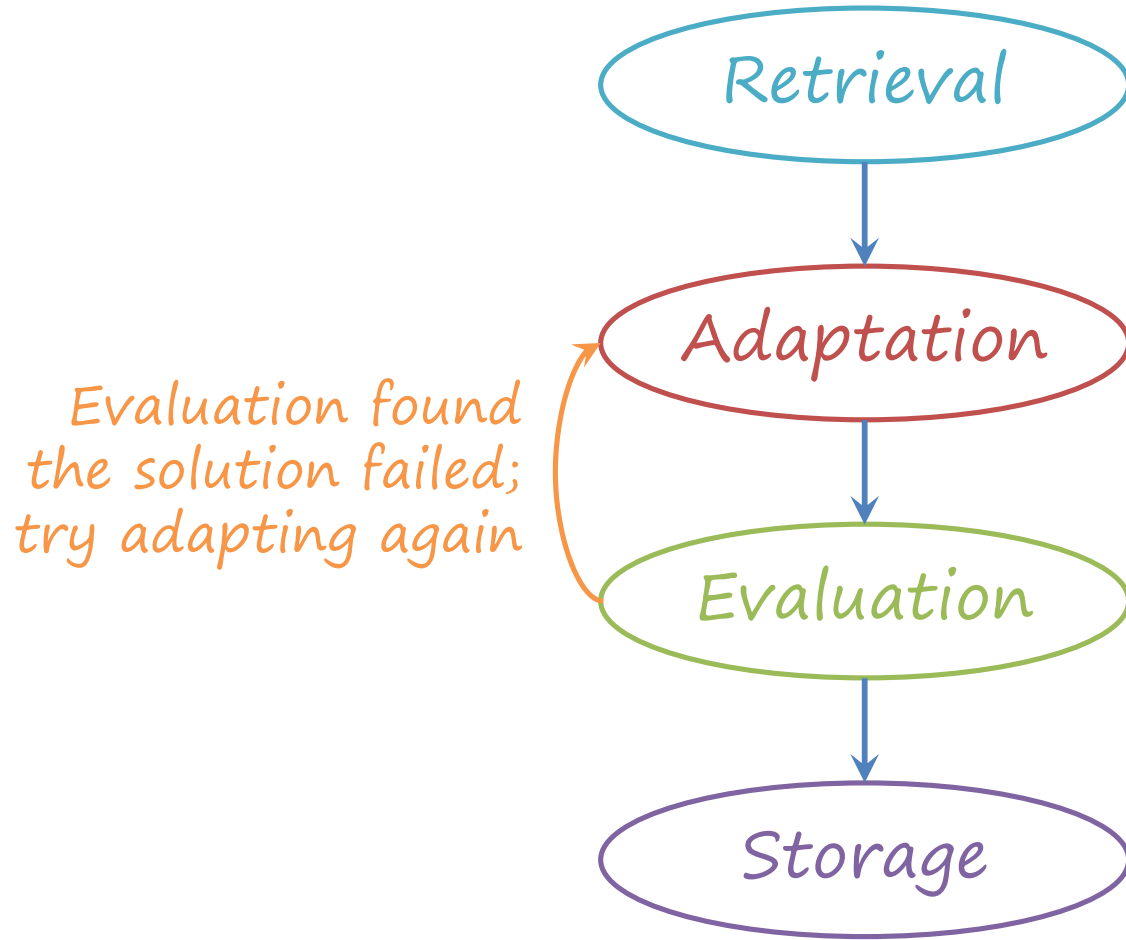
What case should be retrieved and adapted?

Route	Destination _x	Destination _y
 A	10 _E	8 _N
 B	1 _E	8 _N
 C	10 _E	4 _N
 D	2 _E	1 _N
 X	8 _E	2 _N
 Y	8 _E	2 _N
 Z	1 _E	9 _N

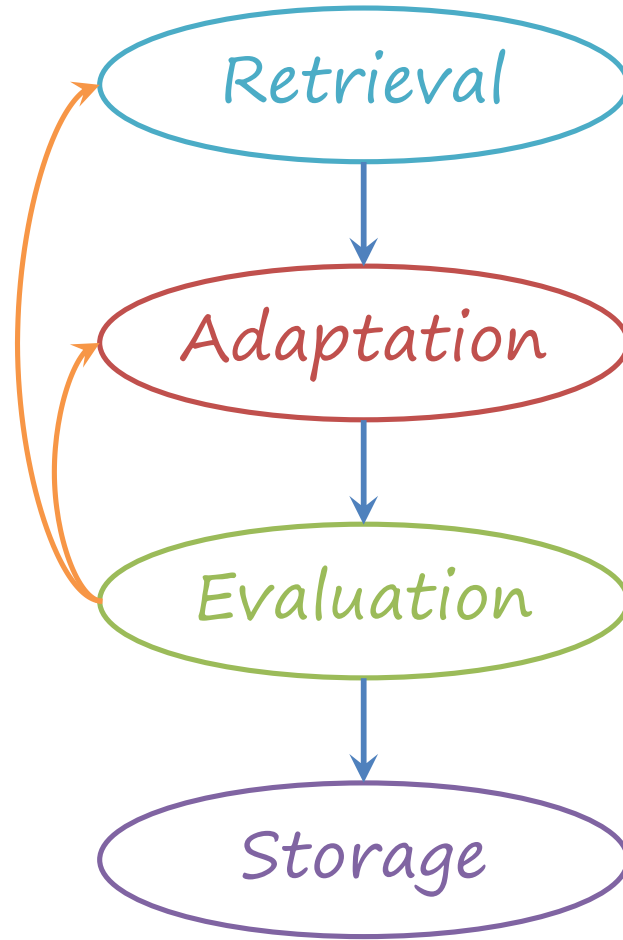


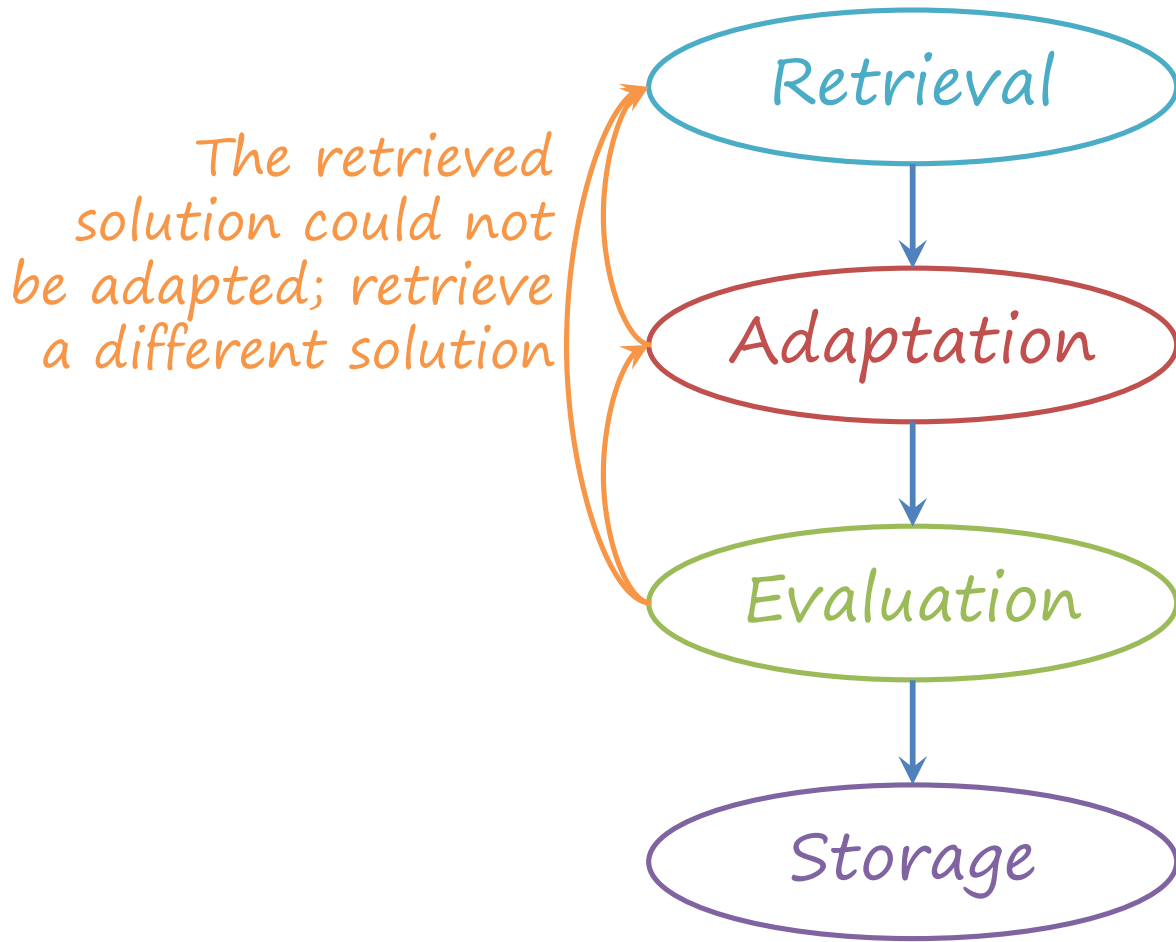
What case should be retrieved and adapted?

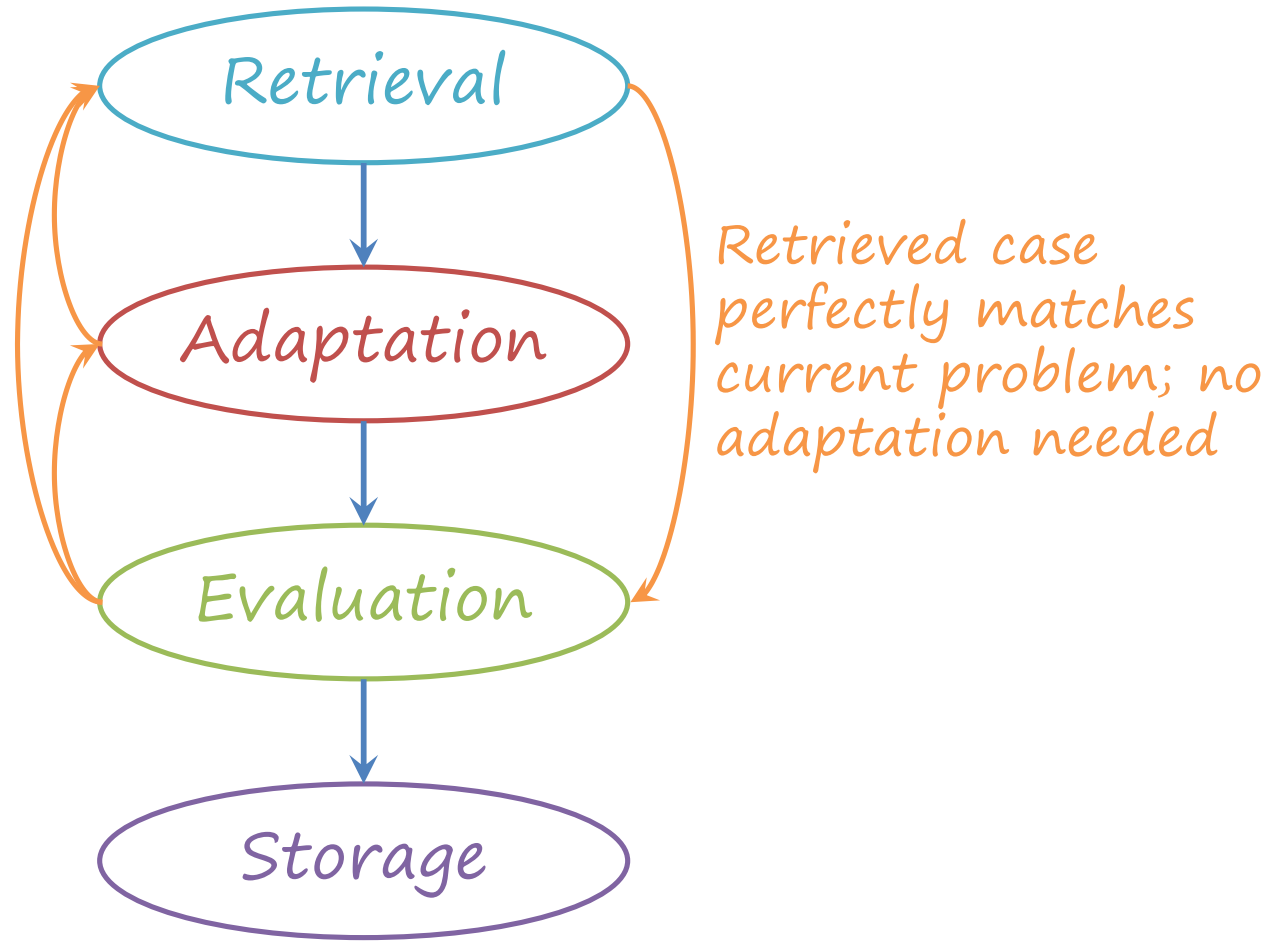




*Evaluation found
the solution failed;
try retrieving a
different solution*







Assignment

How would you use case-based reasoning to design an agent that could answer Raven's Progressive Matrices?

To recap...

- Case adaptation
- Case evaluation
- Case storage
- Case retrieval revisited
- Advanced case-based reasoning