COMP250: Artificial Intelligence

4: Session title here

Learning outcomes

- Outcome 1
- Outcome 2
- Outcome 3

Planning

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Planning

- An **agent** in an **environment**

Planning

- An **agent** in an **environment**
- The environment has a **state**

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- The environment has a **state**
- The agent can perform **actions** to change the state

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Planning

- An **agent** in an **environment**
- The environment has a **state**
- The agent can perform **actions** to change the state
- The agent wants to change the state so as to achieve a **goal**
- Problem: find a sequence of actions that leads to the goal

STRIPS planning

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- **St**anford **R**esearch **I**nstitute **P**roblem **S**olver

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- Describes the state of the environment by a set of **predicates** which are true

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- Models a problem as:
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  - The **goal state** (a set of predicates, specifying whether each should be true or false)

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  - The **goal state** (a set of predicates, specifying whether each should be true or false)
  - The set of **actions**, each specifying:
    - Preconditions (a set of predicates which must be satisfied for this action to be possible)
    - Postconditions (specifying what predicates are made true or false by this action)
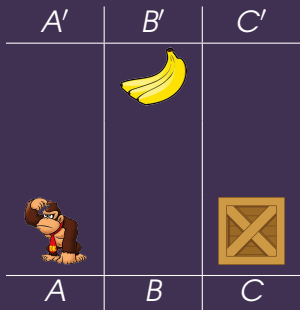
STRIPS example
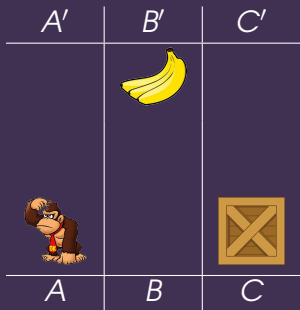
STRIPS example
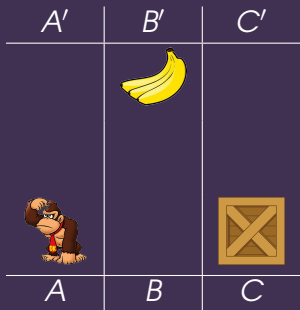
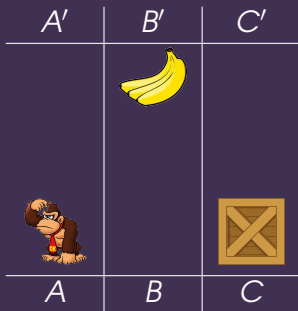Initial state:

```
At(A),
BoxAt(C),
BananasAt(B')
```

STRIPS example

Initial state:

```
At(A),
BoxAt(C),
BananasAt(B')
```

Goal:

```
HasBananas
```

STRIPS example — Actions


```
Move(x, y)
   Pre:  At(x)
   Post: !At(x), At(y)

ClimbUp(x)
   Pre:  At(x), BoxAt(x)
   Post: !At(x), At(x')

ClimbDown(x')
   Pre:  At(x'), BoxAt(x)
   Post: !At(x'), At(x)

PushBox(x, y)
   Pre:  At(x), BoxAt(x)
   Post: !At(x), At(y),
         !BoxAt(x), BoxAt(y)

TakeBananas(x)
   Pre:  At(x), BananasAt(x)
   Post: HasBananas
```
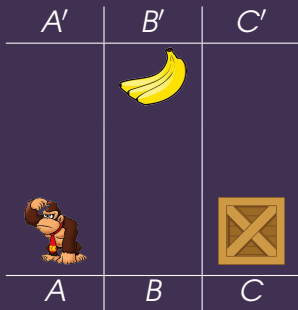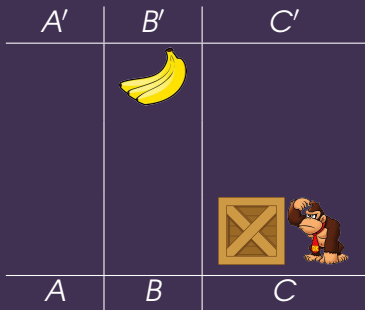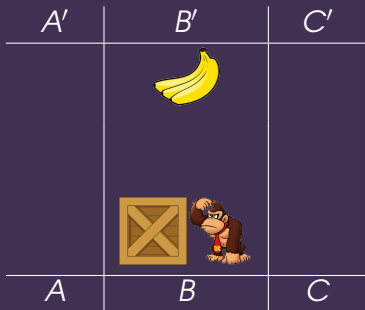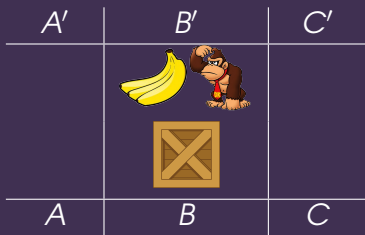
STRIPS example — Solution


```
Move(A, C)
PushBox(C, B)
ClimbUp(B)
TakeBananas(B')
```

STRIPS example — Solution


```
Move(A, C)
PushBox(C, B)
ClimbUp(B)
TakeBananas(B')
```
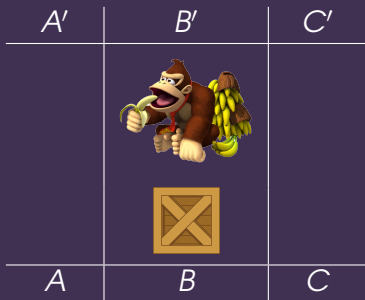
STRIPS example — Solution

| | | |
| A' | B' | C' |

```
Move(A, C)
PushBox(C, B)
ClimbUp(B)
TakeBananas(B')
```

| | | |
| A | B | C |

STRIPS example — Solution

A′	B′	C′
A	B	C

```
Move(A, C)
PushBox(C, B)
ClimbUp(B)
TakeBananas(B')
```

STRIPS example — Solution

A′	B′	C′


```
Move(A, C)
PushBox(C, B)
ClimbUp(B)
TakeBananas(B')
```

A	B	C