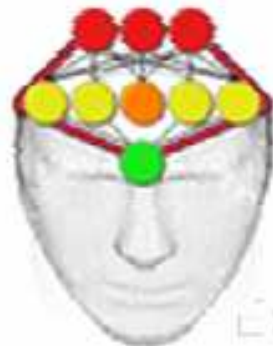




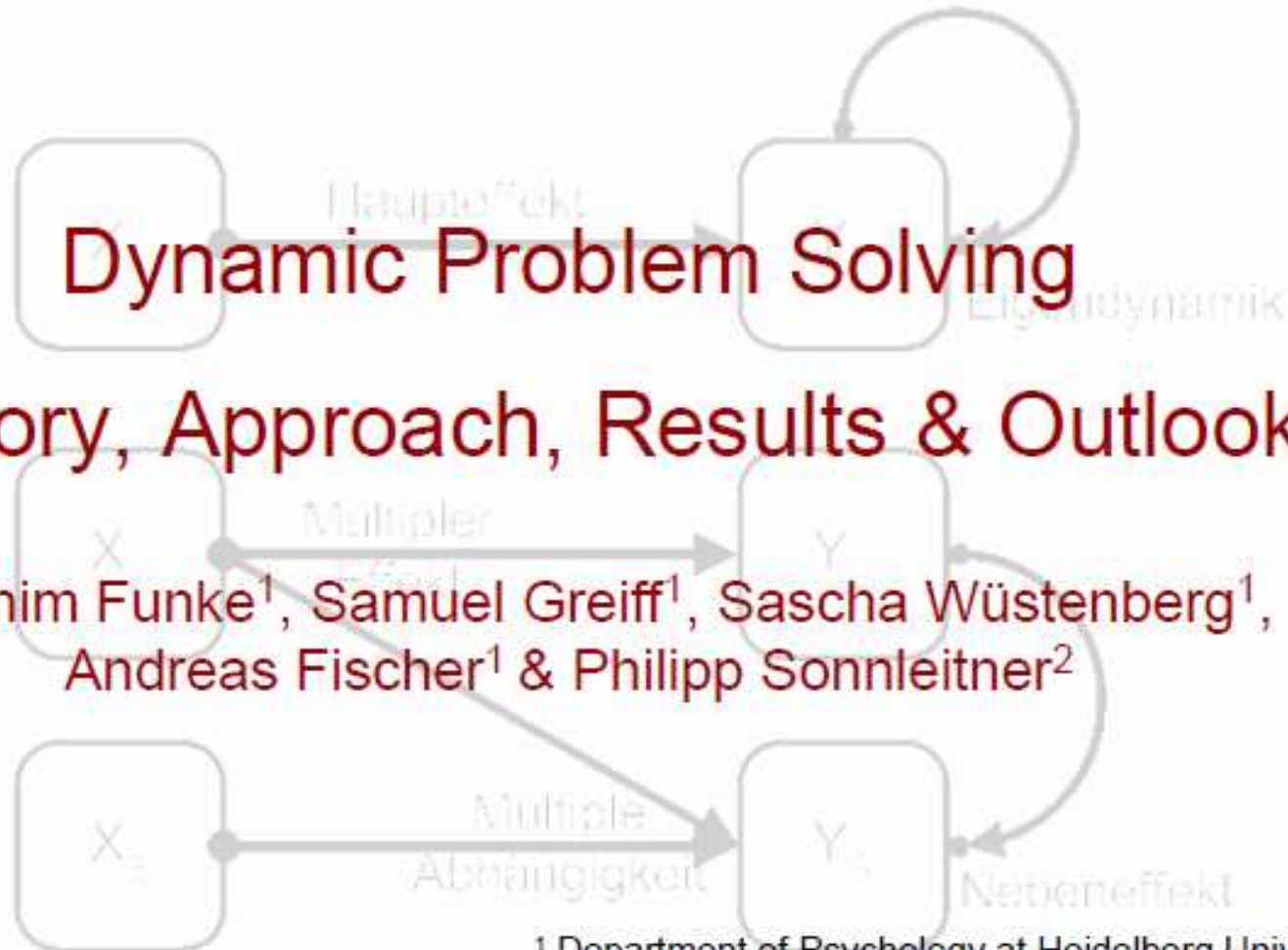
Dynamic Problem Solving

History, Approach, Results & Outlook

Joachim Funke¹, Samuel Greiff¹, Sascha Wüstenberg¹,
Andreas Fischer¹ & Philipp Sonnleitner²



Exogene Variablen



¹ Department of Psychology at Heidelberg University

² EMACS at Luxemburg University



Presentation 4: Facets of Dynamic Problem Solving

Andreas Fischer
University of Heidelberg



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Operative Intelligence (Dörner, 1986)

“Intelligence in a problem solving situation turns out to be being able to gather information, to integrate and structure information goal oriented, to make prognoses, to plan and to make decisions, to set goals and to change them.” (Dörner, 1986, p.292)



Operative Intelligence (Dörner, 1986)

- 1. Information generation**
(due to the **intransparent** situation)
- 2. Information reduction**
(due to the **complex** structure)
- 3. Model building**
(due to the **interconnected** variables)
- 4. System Control & Forecasting**
(due to the **dynamic** system)
- 5. Evaluation & Priority Setting**
(due to the **polytelic** task)



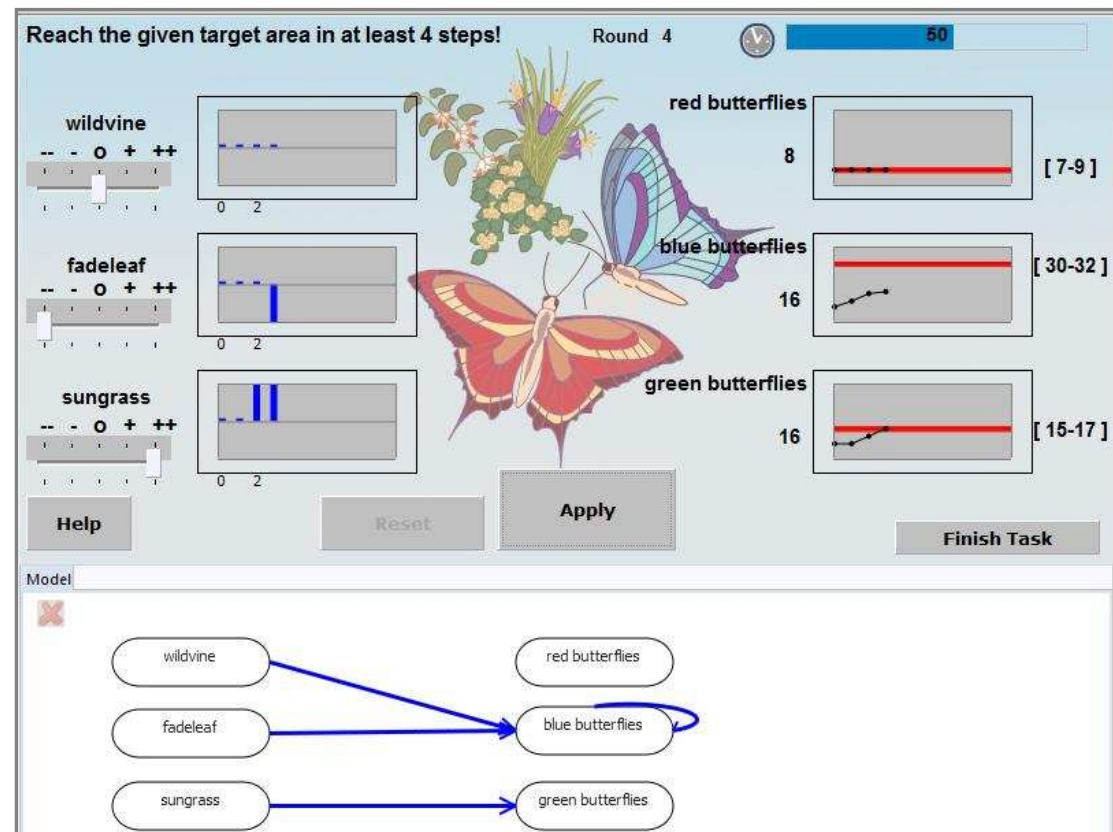
Operative Intelligence (Dörner, 1986)

- 1. Information generation**
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- 3. Model building**
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- 4. System Control & Forecasting**
(due to the **dynamic** system)
5. Evaluation & Priority Setting
(due to the **polytelic** task)



MicroDYN with 3 facets

- **(1) Exploration**
 - „Explore the relations.“
 - 180 seconds
 - VOTAT?
- **(2) Model building**
 - „Draw the relations.“
 - During Phase A
 - Correct model?
- **(3) System Control**
 - „Reach target values.“
 - 90 seconds
 - Target reached?





1) Information reduction

- « Information reduction applies in situations in which tasks contain both **relevant and irrelevant information**, and denotes a change from a strategy that is based on exhaustive processing of all elements of a task to a strategy that **skips the irrelevant task components** » (Gaschler, 2009)
 - Can the most relevant variables be discriminated from less relevant variables? (e.g., to enable parsimonious model building)
 - Are interventions increasingly focused on most relevant variables?



1) Information reduction

- Alternative A

Which variables influence other variables?

wildvine	red butterflies
fadeleaf	blue butterflies
sungrass	green butterflies



1) Information reduction

- Alternative B

Which variable has the most connections to other variables?

wildvine	red butterflies
fadeleaf	blue butterflies
sungrass	green butterflies



1) Information reduction

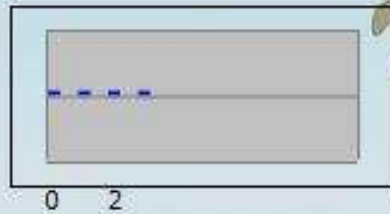
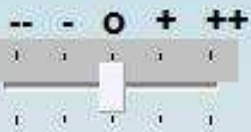
- **Alternative C**
 - Log-File Analysis: Are the interventions increasingly focused on most relevant variables?

Round 4

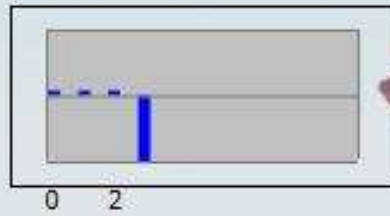
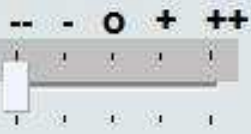


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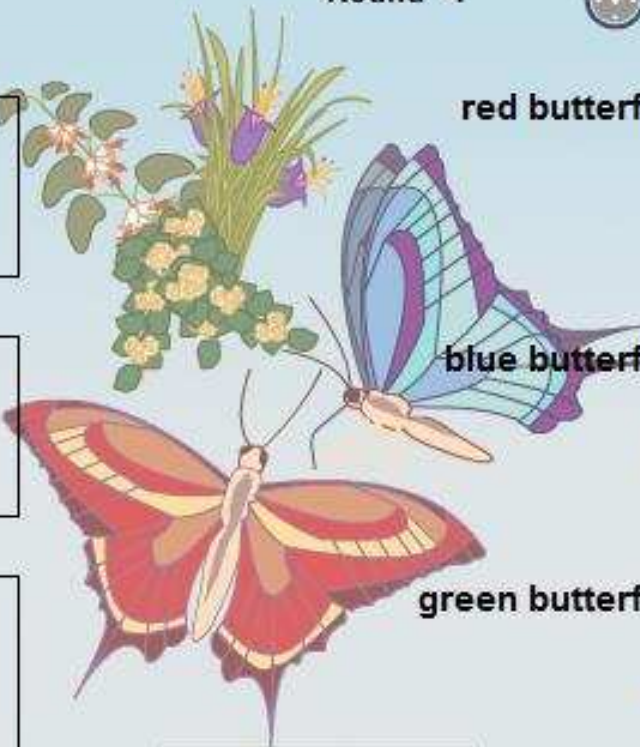
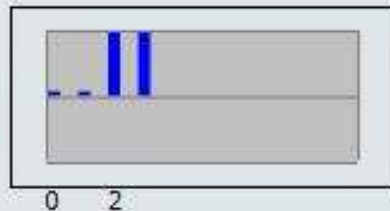
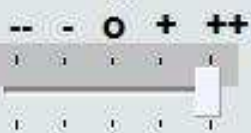
wildvine



fadeleaf



sungrass



red butterflies

8



[7-9]

blue butterflies

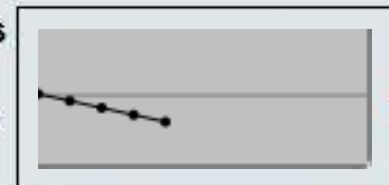
16



[30-32]

green butterflies

16



[15-17]

Help

Reset

Apply

Finish Task

Model



Which variables influence other variables?

wildvine

red butterflies

fadeleaf

blue butterflies

sungrass

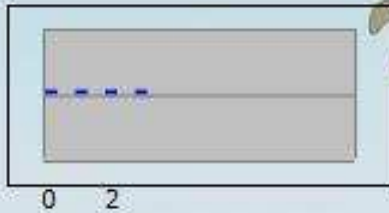
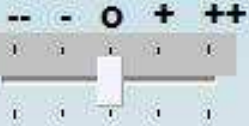
green butterflies

Round 4

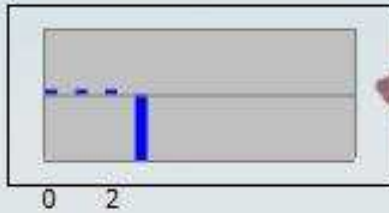


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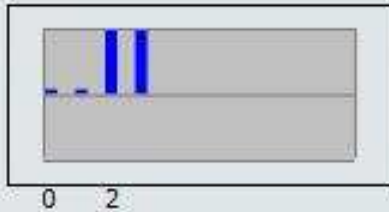
wildvine



fadeleaf



sungrass



red butterflies

8



[7-9]

blue butterflies

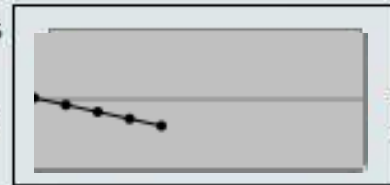
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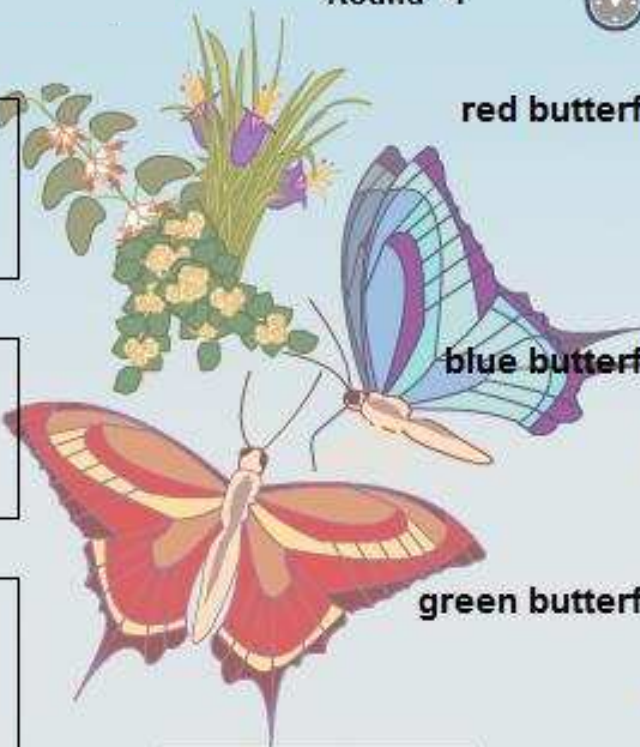
[30-32]

green butterflies

16



[15-17]



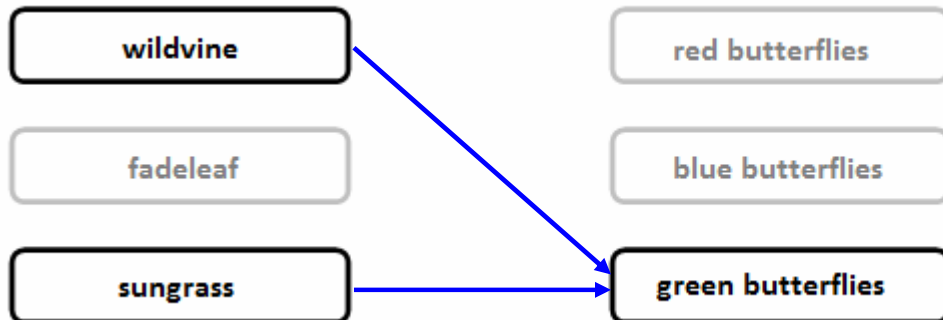
Help

Reset

Apply

Finish Task

Model





2) Evaluation and Priority Setting

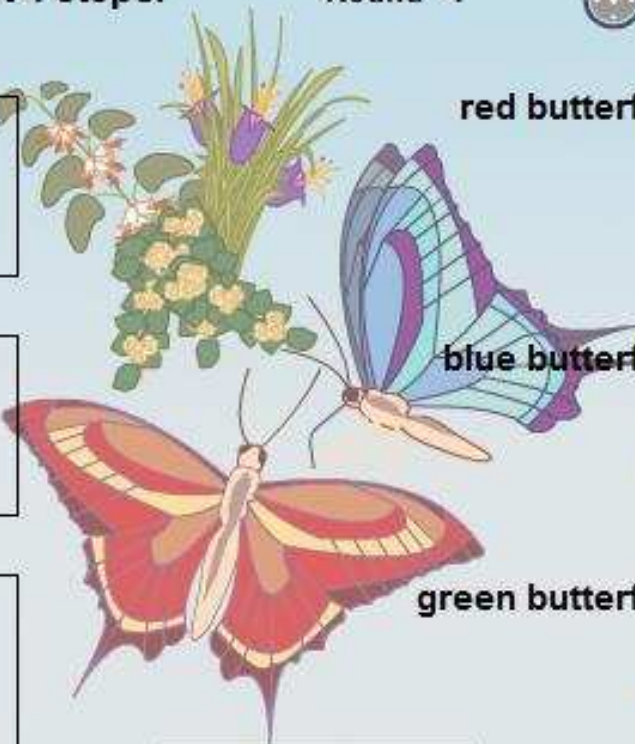
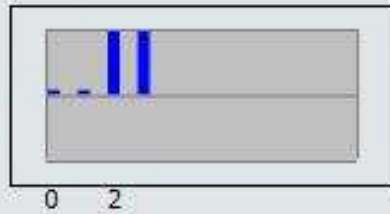
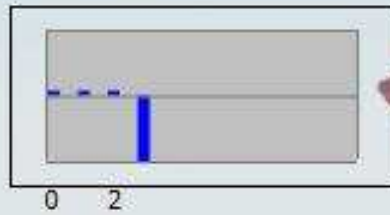
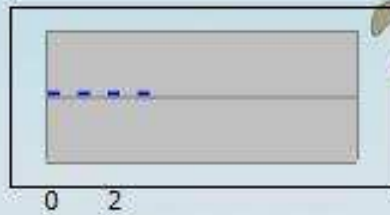
- In Complex Problems the goal state is often dependent on multiple criteria. Sometimes these criteria are interfering with each other
 - Is the best compromise achieved, when confronted with conflicting goals?
 - Is there a tendency to extremes or to balancing, when there is no best compromise?)

Reach the given target area in at least 4 steps!

Round 4



50



red butterflies

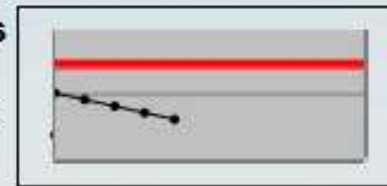
8



[7-9]

blue butterflies

16



[30-32]

green butterflies

16



[15-17]

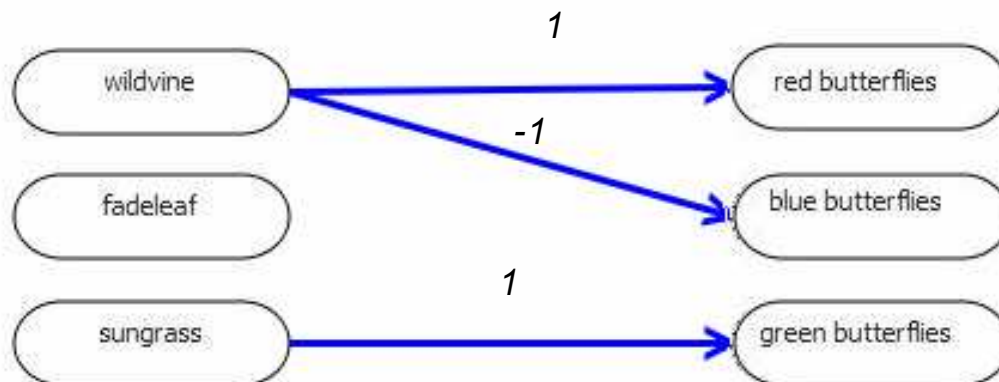
Help

Reset

Apply

Finish Task

Model



Either DV1, DV2, oder both are missed.

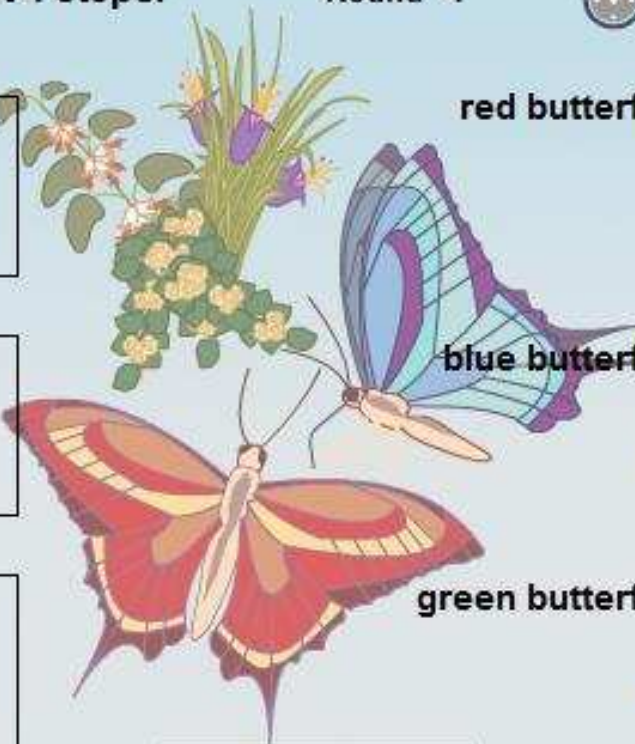
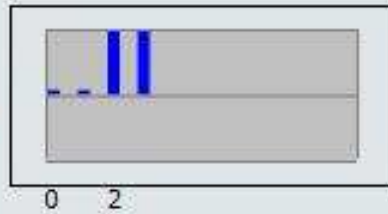
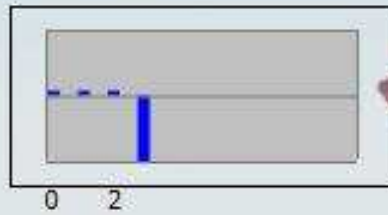
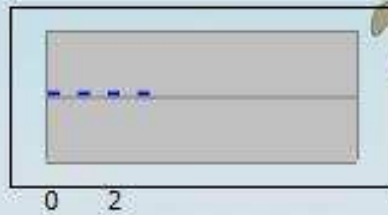
Balancing or Focus on one?

Reach the given target area in at least 4 steps!

Round 4



50



red butterflies

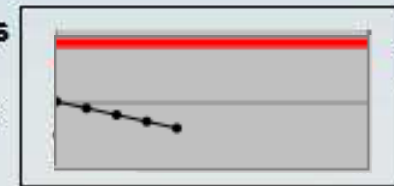
8



[7-9]

blue butterflies

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[30-32]

green butterflies

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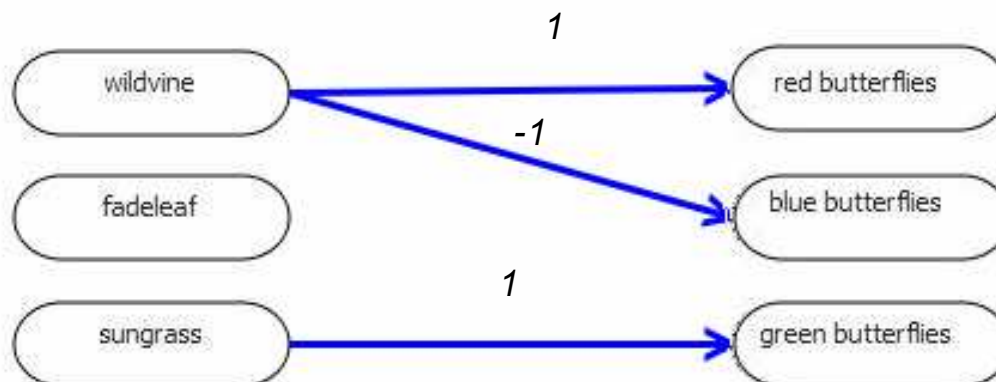
Help

Reset

Apply

Finish Task

Model



DV1 and DV2 not attainable at once

DV2 not attainable either

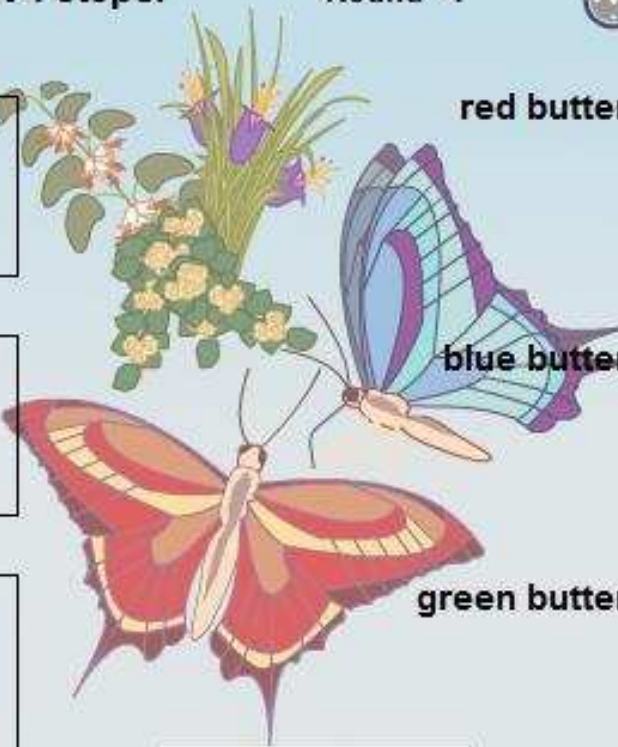
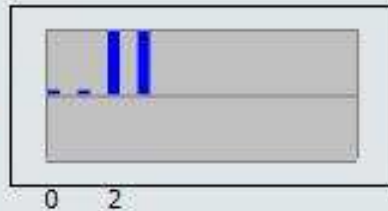
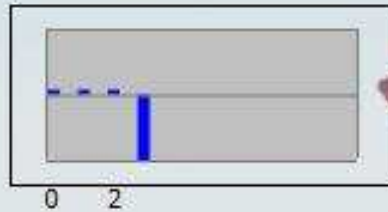
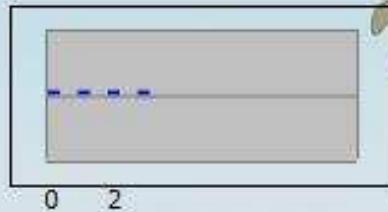
→ DV1 is best compromise

Reach the given target area in at least 4 steps!

Round 4



50



red butterflies

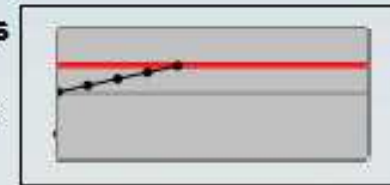
8



[7-9]

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[30-32]

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[15-17]

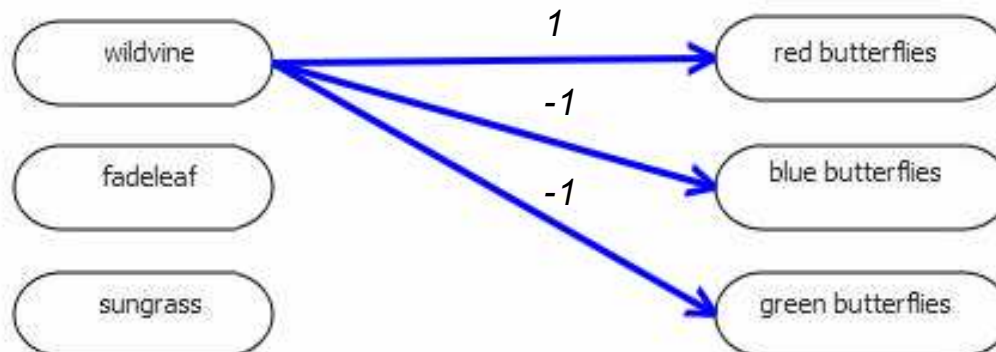
Help

Reset

Apply

Finish Task

Model



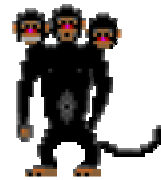
*Either one or two out of three (or none) is attained
→ Missing DV1 is the best compromise*



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Any Questions?



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Thank you for your attention