

# Explanations for Agile Feature Modeling

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## Outline

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- ◆ Agile + SPL: Our view
- ◆ Automated support for Feature Modeling
- ◆ Our proposal: dead features treatment
- ◆ Conclusions

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- ◆ **Agile + SPL: Our view**
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# Agile manifesto

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# Software Product Lines

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Several Products sharing common functionalities



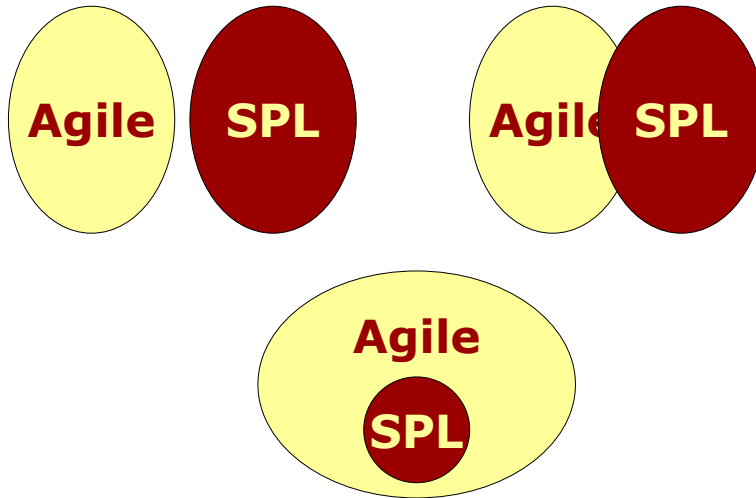
# Both Share Objectives

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## Agile and SPL commonalities

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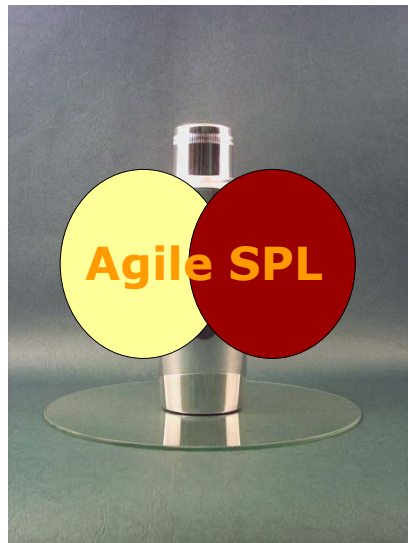


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## Agile + SPL = ?

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Agile



SPL

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# Agile SPL

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# Outline

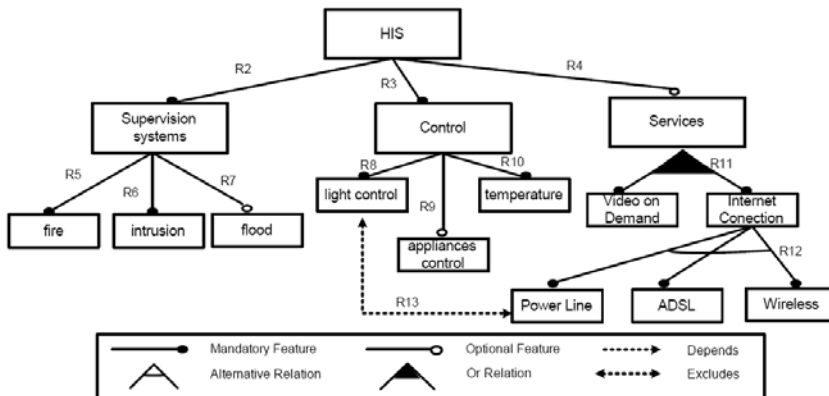
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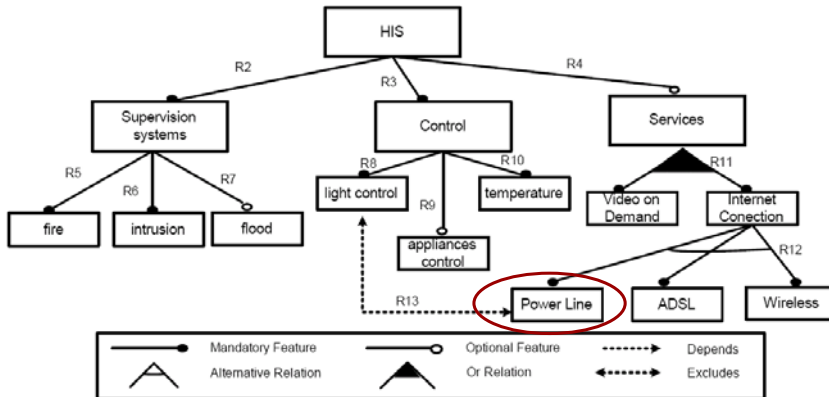
# Feature Models

- ◆ Features + Relations
- ◆ Applications:
  - ◆ Feature Oriented Programming
  - ◆ Generative Programming

# Feature Model Example

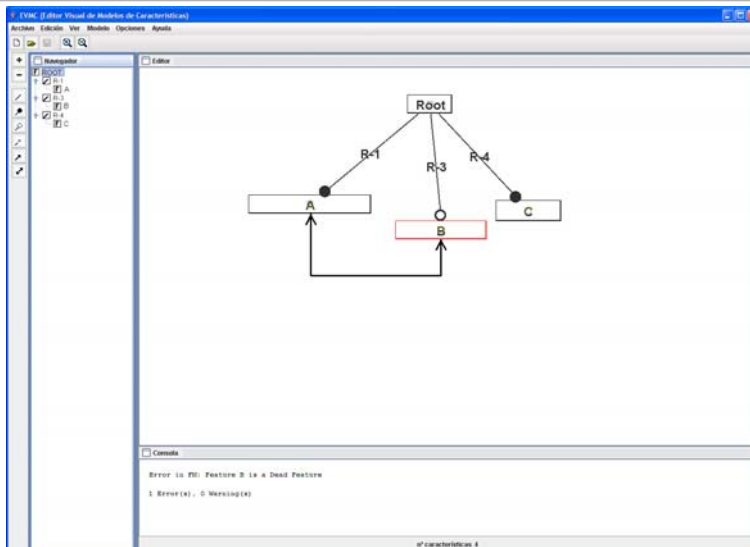


# Dead Features



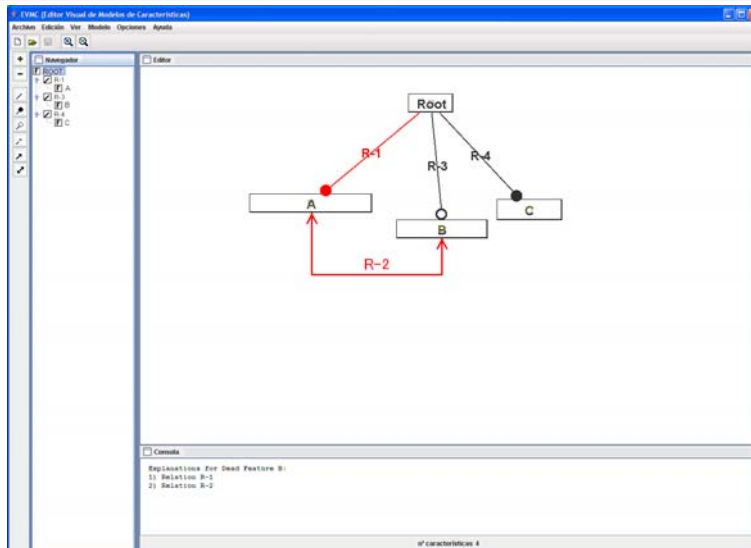
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# Errors Treatment (1)



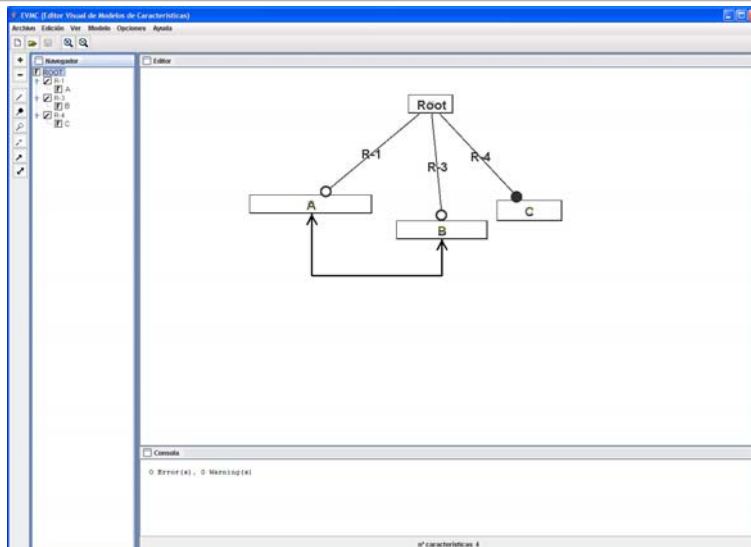
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## Errors Treatment (2)



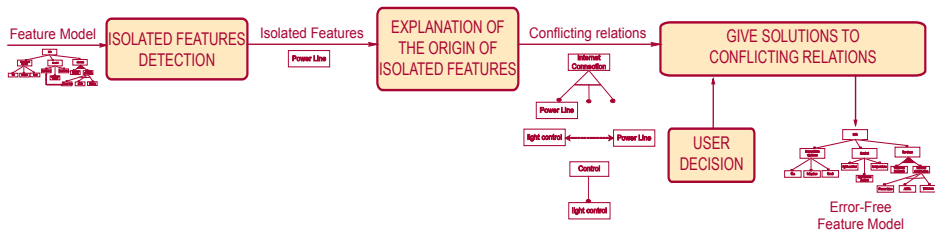
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## Errors Treatment (3)



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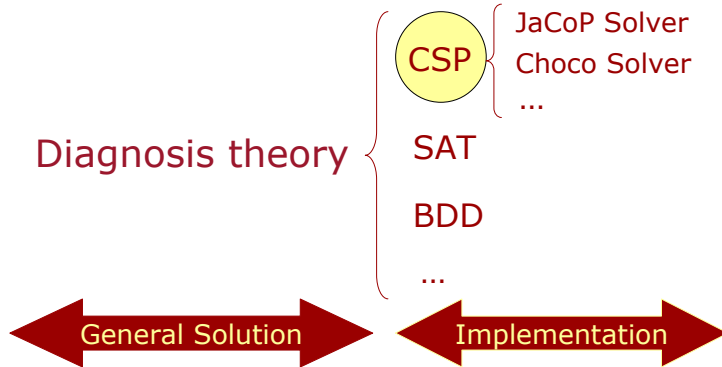
## Errors Treatment (4)



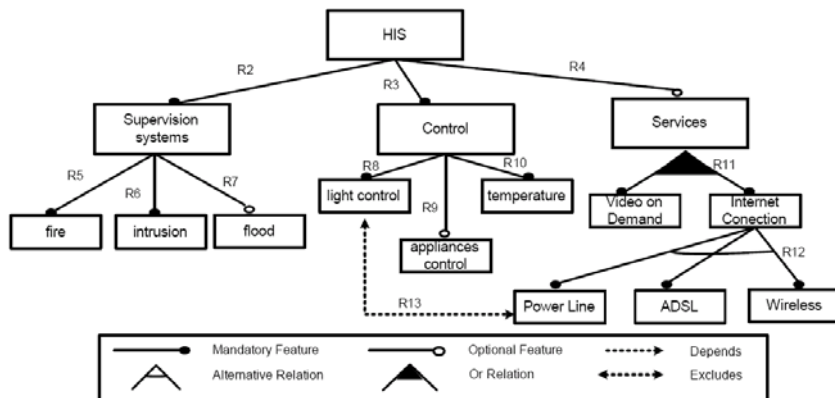
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# Explanations



# Running example (1)

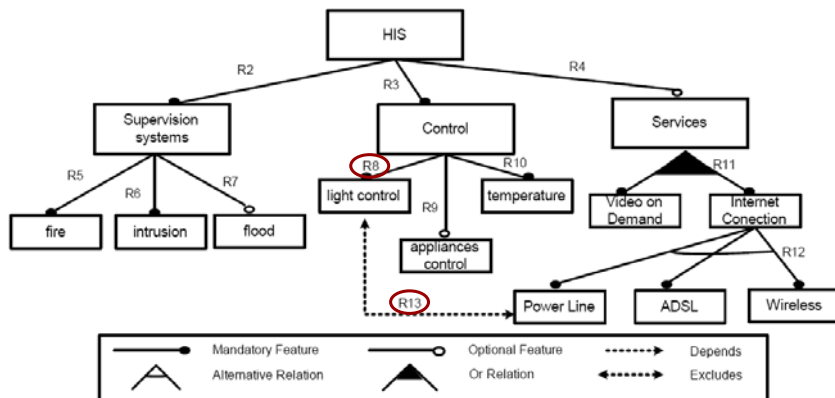


## Running example (2)

System Description			
Relations	Original Constraint	Sensor	Constraint
Root	$c_1 \equiv HIS = 1$	$s_1$	$c'_1 \equiv c_1 \vee s_1 = 0$
R2	$c_2 \equiv SUPERVISION = HIS$	$s_2$	$c'_2 \equiv c_2 \vee s_2 = 0$
R3	$c_3 \equiv CONTROL = HIS$	$s_3$	$c'_3 \equiv c_3 \vee s_3 = 0$
R4	$c_4 \equiv SERVICES = HIS$	$s_4$	$c'_4 \equiv c_4 \vee s_4 = 0$
R5	$c_5 \equiv FIRE = SUPERVISION$	$s_5$	$c'_5 \equiv c_5 \vee s_5 = 0$
R6	$c_6 \equiv INTRUSION = SUPERVISION$	$s_6$	$c'_6 \equiv c_6 \vee s_6 = 0$
R7	$c_7 \equiv FLOOD \Rightarrow SUPERVISION$	$s_7$	$c'_7 \equiv c_7 \vee s_7 = 0$
R8	$c_8 \equiv LIGHT = CONTROL$	$s_8$	$c'_8 \equiv c_8 \vee s_8 = 0$
R9	$c_9 \equiv APP \Rightarrow CONTROL$	$s_9$	$c'_9 \equiv c_9 \vee s_9 = 0$
R10	$c_{10} \equiv TEMPERATURE = CONTROL$	$s_{10}$	$c'_{10} \equiv c_{10} \vee s_{10} = 0$
R11	$c_{11} \equiv (VIDEO \vee INTERNET) \Leftrightarrow SERVICES$	$s_{11}$	$c'_{11} \equiv c_{11} \vee s_{11} = 0$
R12	$c_{12} \equiv POWER \Leftrightarrow (INTERNET \wedge \neg ADSL \wedge \neg WIFI) \wedge$ $ADSL \Leftrightarrow (INTERNET \wedge \neg POWER \wedge \neg WIFI) \wedge$ $WIFI \Leftrightarrow (INTERNET \wedge \neg ADSL \wedge \neg POWER)$	$s_{12}$	$c'_{12} \equiv c_{12} \vee s_{12} = 0$
R13	$c_{13} \equiv LIGHT = 1 \Rightarrow POWER = 0$	$s_{13}$	$c'_{13} \equiv c_{13} \vee s_{13} = 0$
Observation			
Dead Feature	$POWER = 1$	-	$POWER = 1$
Components / Variables			
<i>HIS, SUPERVISION, CONTROL, SERVICES, FIRE, INTRUSION, FLOOD, LIGHT</i> <i>APP, TEMPERATURE, VIDEO, INTERNET, POWER, ADSL, WIFI,</i>			
<small><math>s_1, s_2, s_3, s_4, s_5, s_6, s_7, s_8, s_9, s_{10}, s_{11}, s_{12}, s_{13}</math></small>			

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## Running example (3)



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## Common cases

Feature Model	Conflicting Relations	Feature Model	Conflicting Relations
	{R1}, {R4}		{R1}, {R3}, {R4}
	{R1}, {R4}		{R3}
	{R1}, {R3}		{R1}, {R2}
	{R2}		{R1}, {R2}

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## Conclusions

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### SPL and Agile Methodologies

- ◆ Let's make SPL agiler
- ◆ Tools support is needed

### Feature Models

- ◆ Error-free FMs are needed
- ◆ Explanation tools help on making feature modeling agiler.

## Thanks!

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### Questions?

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