

# Domáca úloha 3

## Formálne metódy tvorby softvéru

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### Úloha 1

**a)**

Nil a  $\tau.\tau.\text{Nil}$

$S = \{ (\text{Nil}, \tau.\tau.\text{Nil}), (\text{Nil}, \tau.\text{Nil}), (\text{Nil}, \text{Nil}) \}$

Je to slabá bisimulácia.

**b)**

$\tau.a.\text{Nil} + \tau.b.\text{Nil}$  a  $a.\text{Nil} + b.\text{nil}$

$S = \{ (\tau.a.\text{Nil} + \tau.b.\text{Nil}, a.\text{Nil} + b.\text{nil}), (a.\text{Nil}, a.\text{Nil} + b.\text{nil}) \dots \text{spor} \}$

Nie je to slabá bisimulácia.

**c)**

$\mu X.\tau.X$  a  $\mu X.(\tau.X + \tau.\text{Nil})$

$S = \{ (\mu X.\tau.X, \mu X.(\tau.X + \tau.\text{Nil})), (\mu X.\tau.X, \text{Nil}) \}$

Je to slabá bisimulácia.

**d)**

$\mu X.\tau.X$  a  $\text{Nil}$   $S = \{ (\mu X.\tau.X, \text{Nil}) \}$

Je to slabá bisimulácia.

**Kontrola úlohy 1 cez CAAL**

# DU3\_1

$A_0 = 0;$   
 $A_1 = \tau \cdot \tau \cdot \theta;$

$B_0 = \tau \cdot a \cdot \theta + \tau \cdot b \cdot \theta;$   
 $B_1 = a \cdot \theta + b \cdot \theta;$

$C_0 = \tau \cdot C_0;$   
 $C_1 = 0;$

$D_0 = \tau \cdot D_0;$   
 $D_1 = \tau \cdot D_1 + \tau \cdot \theta;$

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Satisfied	26 ms	$A_0 \approx A_1$
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Unsatisfied	25 ms	$B_0 \approx B_1$
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Satisfied	25 ms	$C_0 \approx C_1$
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Satisfied	27 ms	$D_0 \approx D_1$
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## DU3\_2

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ProtokolSpecifikacia = in_1.'out_1.ProtokolSpecifikacia +
in_2.'out_2.ProtokolSpecifikacia + in_3.'out_3.ProtokolSpecifikacia;

Medium1 = sm_10.('mr_10.Medium1 + Medium1) + sm_11.('mr_11.Medium1 +
Medium1) + sm_20.('mr_20.Medium1 + Medium1) + sm_21.('mr_21.Medium1 +
Medium1) + sm_30.('mr_30.Medium1 + Medium1) + sm_31.('mr_31.Medium1 +
Medium1);

Sender0 = in_1.'sm_10.Sender_10 + in_2.'sm_20.Sender_20 +
in_3.'sm_30.Sender_30;
Sender_10 = 'sm_10.Sender_10 + ms_0.Sender1;
Sender_20 = 'sm_20.Sender_20 + ms_0.Sender1;
Sender_30 = 'sm_30.Sender_30 + ms_0.Sender1;

Sender1 = in_1.'sm_11.Sender_11 + in_2.'sm_21.Sender_21 +
in_3.'sm_31.Sender_31;
Sender_11 = 'sm_11.Sender_11 + ms_1.Sender0;
Sender_21 = 'sm_21.Sender_21 + ms_1.Sender0;
Sender_31 = 'sm_31.Sender_31 + ms_1.Sender0;

Receiver0 = mr_10.'out_1.'rm_0.Receiver0_ack +
mr_20.'out_2.'rm_0.Receiver0_ack + mr_30.'out_3.'rm_0.Receiver0_ack;
Receiver0_ack = mr_10.'rm_0.Receiver0_ack + mr_20.'rm_0.Receiver0_ack +
mr_30.'rm_0.Receiver0_ack + Receiver1;

Receiver1 = mr_11.'out_1.'rm_1.Receiver1_ack +
mr_21.'out_2.'rm_1.Receiver1_ack + mr_31.'out_3.'rm_1.Receiver1_ack;
Receiver1_ack = mr_11.'rm_1.Receiver1_ack + mr_21.'rm_1.Receiver1_ack +
mr_31.'rm_1.Receiver1_ack + Receiver0;

Medium2 = rm_0.('ms_0.Medium2 + Medium2) + rm_1.('ms_1.Medium2 + Medium2);

Protokol = (Sender0|Medium1|Medium2|Receiver0)\{sm_10, sm_11, sm_20, sm_21,
sm_30, sm_31, mr_10, mr_11, mr_20, mr_21, mr_30, mr_31, rm_0, rm_1, ms_0,
ms_1};
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Satisfied

402 ms

Protokol  $\approx$  ProtokolSpecifikacia