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CS4110  
Homework 9  
Due November 16

### **P01. Post Machine**

Trace the paths of the following input strings on this PM. At every step, name the current state and the contents of the STORE: "abab", "aabbbb", and "bbabaaa".

#### **Trace "abab"**

START	abab
READ2	abab
READ1	bab
READ2	ab
READ1	b
READ2	NULL
ACCEPT	

#### **Trace "aabbbb"**

START	aabbbb
READ2	aabbbb
READ1	abbbb
ADD a	
READ1	bbbba
READ2	bbba
READ3	bba
ADD b	
READ3	bab
ADD b	
READ3	abb
READ2	bb
READ3	b
READ3	b
ADD b	
READ3	b
ADD b	
LOOP	b

#### **Trace "bbabaaa"**

START	bbabaaa
READ2	bbabaaa
READ3	babaaa
ADD b	
READ3	abaaab
READ2	baaab
READ3	aaab
READ2	aab
READ1	ab
ADD a	
READ1	ba
READ2	a
READ1	NULL
CRASH	

## P02. 2PDA

Trace the execution of these input strings on this machine: "aabb" and "babab".

Trace of "aabb"

<u>STATE</u>	<u>TAPE</u>	<u>STACK1</u>	<u>STACK2</u>
START	aabb	Δ	Δ
READ	aabb	Δ	Δ
PUSH1 a	Δabb	a	Δ
READ	Δabb	a	Δ
PUSH1 a	ΔΔbb	aa	Δ
READ	ΔΔbb	aa	Δ
PUSH2 b	ΔΔΔb	aa	b
READ	ΔΔΔb	aa	b
PUSH2 b	ΔΔΔΔ	aa	bb
READ	ΔΔΔΔ	aa	bb
POP1	ΔΔΔΔ	a	bb
POP2	ΔΔΔΔ	a	b
POP1	ΔΔΔΔ	Δ	b
POP2	ΔΔΔΔ	Δ	Δ
POP1	ΔΔΔΔ	Δ	Δ
POP2	ΔΔΔΔ	Δ	Δ
ACCEPT	ΔΔΔΔ	Δ	Δ

Trace of "babab"

<u>STATE</u>	<u>TAPE</u>	<u>STACK1</u>	<u>STACK2</u>
START	babab	Δ	Δ
READ	babab	Δ	Δ
PUSH2 b	abab	Δ	b
READ	abab	Δ	b
PUSH1 a	bab	a	b
READ	bab	a	b
PUSH2 b	ab	a	bb
READ	ab	a	bb
PUSH1 a	b	aa	bb
READ	b	aa	bb
PUSH2 b	Δ	aa	bbb
READ	Δ	aa	bbb
POP1	Δ	a	bbb
POP2	Δ	a	bb
POP1	Δ	Δ	bb
POP2	Δ	Δ	b
POP1	Δ	can't pop	b
CRASH			

## P02. 2PDA

Draw a PM that accepts the language  $\{ a^n b^n a^n b^n \}$

