

**CS 354: Intro to Computer Systems (Spring 2018)**  
**Assembly - Worksheet 2**

1. Stack Pointer

Instruction: `pushl S`  
Description: Push double word  
Effect:  
 $R[\%esp] \leftarrow R[\%esp] - 4;$   
 $M[R[\%esp]] \leftarrow S$

Instruction: `popl D`  
Description: Pop double word  
Effect:  
 $D \leftarrow M[R[\%esp]];$   
 $R[\%esp] \leftarrow R[\%esp] + 4$

Assume the values in `%eax`, `%edx`, and `%esp` are `0x123`, `0`, and `0x108` respectively.

What are the values of the registers after the following instructions.

	<code>%eax</code>	<code>%edx</code>	<code>%esp</code>
<code>pushl %eax</code>			
<code>popl %eax</code>			

## 2. Load Effective Address

Instruction: `leal S, D`

Description: Load effective address

Effect:  $D \leftarrow \&S$

Suppose register `%eax` holds value  $x$  and `%ecx` holds value  $y$ . Fill in the table below with formulas indicating the value that will be stored in register `%edx` for each of the given assembly code instructions: [From CSAPP: 3.6]

Instruction	Result
<code>leal 6(%eax), %edx</code>	
<code>leal (%eax,%ecx), %edx</code>	
<code>leal (%eax,%ecx,4), %edx</code>	
<code>leal 7(%eax,%eax,8), %edx</code>	
<code>leal 0xA(,%ecx,4), %edx</code>	
<code>leal 9(%eax,%ecx,2), %edx</code>	