

Problem ST-6 (3 parts)**Pointers and Arrays**

Assuming a 32-bit system with 32-bit memory interface and 32-bit addresses, answer the following questions.

Part A Show how the following global variables map into static memory. Assume it is allocated starting at address 5000. For each variable, draw a box showing its size and position in memory. Label the box with the variable name. Label each element of an array (e.g., Name[0]).

		5000	X			
		5004	Name [0]	Name [1]	Name [2]	Name [3]
int	X;	5008	Y			
char	Name[] = "Sad";	5012	Z [0]			
int	*Y;	5016	Z [1]			
int	Z[] = {37, 69, 42};	5020	Z [2]			
		5024				

Part B Suppose the following variables are allocated beginning at address 6000. Complete the table below, listing the value of the expression following this definition.

int	A = 21, B = 49, C = 10, D = 66;						
int	*P = &B;						
&D	<u>6012</u>	*P+1	<u>50</u>	P+1	<u>6008</u>	C+1	<u>11</u>
P == B	<u>0</u>	&P	<u>6016</u>	P[1]	<u>10</u>	*(P-1)	<u>21</u>

Explain what happens if **P** is incremented (e.g., **P++**).

This pointer (to an integer) is incremented to point at integer **C** (6008).

Part C Explain the key management difference between static memory and the stack.

Static memory is allocated at compile time.

The stack is allocated at run time.