## von Neumann Model

John von Neumann	
Instruction	
Word	
von Neumann Model	
PB&J Analogy	
Complete the von Neumann model diagram	

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5 Componer			
1		 	
2		 	 
3		 	 
4		 	
5		 	 
Processing	Unit		
>>		 	
>> PB&J ar	nalogy		
>> General	.ly operates on	 	 
In MIPS	j,		
>> At mini	.mum,		
	<u> </u>		
1 - ALU		 	 
2 - GPR			

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4	

ALU	Draw an ALU
>> performs	
>> e.g	
Registers	
Flip flop	Draw a flip flop
>>	
>>	
Register	Draw a 4 bit register
>> composed of	
<b>&gt;&gt;</b>	
>> Stored in a	
>> MIPS	
Control Unit	
>>	
>>	
>>	
>> PB&J analogy	

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PB&J analogy	·	
emory		
		Post Office Analogy
ADDRESS	DATA	
	+	
dress Space		
aress space		
address hits		
g		
dressability		

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Example: 8 byte memory space

1-byte addressable		word addressable (1 word = 4 bytes)		
ADDRESS	DATA	ADDRESS DATA		
		How many bits are ne address?	eded for the	
How many bits are ne address?	eded for the			

Examp	le:	32	byte	memory	/ S	pace
-------	-----	----	------	--------	-----	------

2-byte addressable	word addressable (1 word = 8 bytes)			
ADDRESS DATA	ADDRESS DATA			
How many addresses do we have (What is	How many addresses do we have (What is			
the size of the address space)?	the size of the address space)?			
How many bits are needed for the	How many bits are needed for the			
address?	address?			

## Powers of 2

2 <sup>10</sup>	2 <sup>20</sup>	2 <sup>30</sup>	2 <sup>40</sup>	2 <sup>50</sup>

## Example: 32KB byte memory space

Assume a 32KB memory is 8 byte addressable. What is the size of the address space? How many bits are needed for the address?

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Example:	256GB	bvte	memory	ı space
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Assume a 256GB memory is 64 byte addressable. What is the size of the address space? How many bits are needed for the address?

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