Power Budget

Team Number:	206
Project Name:	Modular Motion-and-light sensing control subsystem
Team Member Names:	Adrian Perez, Zane Brauer
Version:	

A. List ALL major components (active devices, integrated circuits, etc.) except for power sources, voltage regulators, resistors, capacitors, or passive

All Major Components	Component Name	Part Number	Supply	#	Absolute	Total	Unit
	Curiosity Nano (PIC18F57Q43 board)	PIC18F57Q43	1.8V to 5.5V	1	50	50	mA
	Motor Driver	TB6612FNG	2.7V - 5.5V	1	50	50	mA
	DC Motor (Gearmotor)	Pololu 37D 12V DC	12V	1	5500	5500	mA
	Ambient Light Sensor	LTR-329ALS-01	2.4V to 3.6V	1	1	1	mA
	PIR Motion Sensor	LS6501LP	11V - 25V	1	1	1	mA
	Operational Amplifier	TLV2372IDR	2.7V to 16V	1	1	1	mA
	Pushbutton Switch	Omron B3F	Rated upto 24V	1	0	0	mA
	Indicator LED	WP710A10ND	2V (forward voltage)	1	10	10	mA

B. Assign each major component above to ONE power rail below. Try to minimize the number of different power rails in the design.

+12V Power Rail	Component Name	Part Number	Supply	#	Absolute	Total	Unit
	DC Motor (Gearmotor)	Pololu 37D 12V DC	12V	1	5500	5500	mA
	PIR Motion Sensor	LS6501LP	11V - 25V	1	1	1	mA
						0	mA
						0	mA
						0	mA
					Subtotal	5501	mA
					Safety Margin	25%	
					Total Current Required on +12V Rail	6876.25	mA
c1. Regulator or Source Choice	External 12V, 10A SMPS	Mean Well LRS-100-12	12V	1	8500	8500	mA
					Total Remaining Current Available on +12V Rail	1623.75	mA

+5V Power Rail	Component Name	Part Number	Supply	#	Absolute	Total	Unit
	Curiosity Nano (MCU board)	PIC18F57Q43	1.8V to 5.5V	1	50	50	mA
	Motor Driver	TB6612FNG	2.7V - 5.5V	1	50	50	mA
	Operational Amplifier	TLV2372IDR	2.7V to 16V	1	1	1	mA
	Indicator LED	WP710A10ND	2V (forward voltage)	1	10	10	mA
	Pushbutton	Omron B3F	Rated upto 24V	1	0	0	mA
					Subtotal	111	mA
					Safety Margin	25%	
					Total Current Required on +5V Rail	138.75	mA
c2. Regulator or Source Choice	+5V Regulator	Pololu S13V15F5	2.8V - 22V	1	1500	1500	mA
					Total Remaining Current Available on +5V Rail	1361.25	mA

+3.3V Power Rail	Component Name	Part Number	Supply	#	Absolute	Total	Unit
	Ambient light Sensor (I^2C)	LTR-329ALS-01	+2.4 - 3.6V	1	1	1	mA
						0	mA
						0	mA
						0	mA
					Subtotal	1	mA
					Safety Margin	25%	
					Total Current Required on +3.3V Rail	1.25	mA
c3. Regulator or Source Choice	+3.3V low-dropout regulator	KA78RM33RTF	+5V - 20V	1	500	500	mA
					Total Remaining Current Available on 3.3V Rail	498.75	mA

C. For each power rail above, select a specific voltage regulator using the same process as for major component selection. Confirm that the Total Remaining

Rail	Component Name	Part Number	Supply	#	Absolute	Total	Unit
+12V Power Rail	External 12V, 10A SMPS	Mean Well LRS-100-12	12V	1	8500	1	mA
+5V Power Rail	+5V Regulator	Pololu S13V15F5	2.8V - 22V	1	1500	1500	mA
+3.3V Power Rail	+3.3V low-dropout regulator	KA78RM33RTF	+5V - 20V	1	500	500	mA
					Subtotal	2001	mA

D. Select a specific external power source (wall supply or battery) for your system, and confirm that it can supply all of the regulators for all of the power rails

External Power Source 1	Component Name	Part Number	Supply	Output	Absolute	Total	Unit
Power Source 1 Selection	Plug-in Wall Supply	Mean Well GST25A24-P1J	110VAC	+24V	5000	5000	mA
Power Rails Connected to External Power Source 1	+12V regulator	LM7812	+12V - 35V	+12V	1000	1000	mA
	+5V Regulator	LM7805	+7V - 25V	+5V	1000	1000	mA
	+3.3V low-dropout regulator	KA78RM33RTF	+5V - 20V	+3.3V	500	500	mA
			Total Remaining Current Available on External Power Source 1			2500	mA

External Power Source 2	Component Name	Part Number	Supply	Output	Absolute	Total	Unit
Power Source 2 Selection	Battery	Duracell MN1604 (9V)	+9V	+-9V	500	500	mA
Power Rails Connected to External Power Source 2	-5V Regulator	LM7905	-8V - -25V	-5V	500	500	mA
			Total Remaining Current Available on External Power Source 2			500	mA

Notes

External Supply Voltage should be determined by the dropout voltage for highest-voltage regulator (e.g., +14V for a +12V regulator).

If you have multiple units in your design (e.g., a base unit and remote unit) then you need a separate power budget for each unit