egr 3X4

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1. Determine your project-specific requirements		3. Look up specifications in the PIC datasheet		
Design Considerations	**Team Project-Specific Requirements** from Problem Definition and Block Diagram	**PIC Option 1**	**PIC Option 2**	**PIC Option 3**
How many GPIO Pins?[1]	None	**28**	**28**	**25**
Built-in Analog to Digital Converter? How many?	None	**1**	**1**	**1**
Built-in Hardware PWM? How many?	None	**3**	**2**	**2**
Built-in I2C? SPI? How many?	I2C. One	**2**	**1**	**2**
Built-in UART? How many?	one	**2**	**2**	**2**
Other Required Built-In Features? *(optional)*				
Additional considerations specific to your project specifications *(optional)*				
2. Find 3 microcontrollers that meet your team project-specific requirements and find information on each		**4. Look up part details in the PIC datasheet**		
Microcontroller Considerations	**Instructions**	**PIC Option 1**	**PIC Option 2**	**PIC Option 3**

[1] No PIC16F887, PIC16F917, PIC18F47Q10, or dsPICs allowed

Part Number[2]	*Include the entire part number (leave off any letters at the end that specify the package type)*	**PIC18F47J53**	**PIC16F876A**	**PIC18F27Q10**
Link (URL) to product page	*Do not paste links directly into the table. Instead, link them like this.*	**LINK**	**LINK**	**LINK**
Links (URL) to Data Sheets		**LINK**	**LINK**	**LINK**
Links (URL) to Application Notes	*Often provided by manufacturers to give you specific examples of how to use their products. Search for them in the search bar on the Microchip's website.*	**LINK**	**LINK**	**LINK**
Links (URL) to Code Examples		**LINK**	**LINK**	**LINK**
Links (URL) to External Resources	*Search on Google and YouTube for other resources for each specific microcontroller.*	**LINK**	**LINK**	**LINK**
Production Unit Cost	*Find in the Microchip online store, or Digikey*	**5.5**	**6.45**	**1.78**
Supply Voltage Range	*Find in the microcontroller datasheet*	**2-3.6**	**2-5.5**	**1.8-5.5**
Absolute Maximum Current for entire IC	*Find in the microcontroller datasheet*	**6.2uA**	**7.8uA**	**5.8uA**
Maximum GPIO Pin Current (Source/Sink)	*Find in the microcontroller datasheet*	**2.3uA**	**3.5uA**	**2uA**
8-bit or 16-bit Architecture	*Find in the microcontroller datasheet*	**8bit**	**8bit**	**8bit**

[2] General Purpose Input/Output Pins - calculate based on your block diagram and include at least 20% more than you need. Avoid using In-System Programming (ISP) pins for GPIO.

Available IC Packages / Footprints	*Find in the microcontroller datasheet. Choose a microcontroller with both surface mount and DIP/through-hole packages available. See Most Common Mistakes below for requirements to improve manufacturing reliability.*	**surface mount/through-hole**	**surface mount/through-hole**	**surface mount/through-hole**
Supports External Interrupts?	*Find in the microcontroller datasheet*	**yes**	**yes**	**yes**
In-System Programming Capability and Type	*Allows for programming the microcontroller without removing it from the PCB. Find in the microcontroller datasheet.*	**ICSP**	**SQTP**	**ICSP**
Programming Hardware, Cost, and URL	*Find on the microcontroller product page*			
Works with MPLAB® X Integrated Development Environment (IDE)?	*Required. See Microchip Development Tools*	**YES**	**yes**	**YES**
Works with Microchip Code Configurator?	*Required. Go to the MCC website, click the "Manual Downloads" tab, scroll to the device library that goes with the PIC you chose (likely "MCC 8-bit PIC") and read the release notes to make sure your microcontroller is in the list of supported devices.*	**YES**	**No**	**YES**

5. Write overall pros, cons, and rankings for the chosen microcontrollers				
Overall Pros	*Write at least 2 for each microcontroller*	**1.has code example for temperature sensor 2.has 2 i2c for using**	**1.Affordable 2.has i2c for using**	**1.Affordable 2.has i2c for using 3.Can work with MCC Melody**
Overall Cons	*Write at least 2 for each microcontroller*	**1.The program memory size is low 2.the cpu runs slowly 3.Not support MCC Melody**	**1.SPI,I2CandUART use same port 2.Can not work with MCC**	**1.Limited working temperature range**
Ranking	*1 = first, 2 = second, 3 = third*	**2**	**3**	**1**

6. Final Microcontroller Choice: PIC18F27Q10-I/SO

Rationale: This is very practical, and the price is affordable, and the delivery time is very timely. At the same time, it also meets the needs of all course projects: with i2c communication, with UART, suitable for MPlab IDE, and suitable for MCC Melody. Also the In-System Programming Capability and Type is ICSP which fulfills the project requirement. There is also a complete programming tutorial for the temperature sensor, so our team thought this would be the best choice.