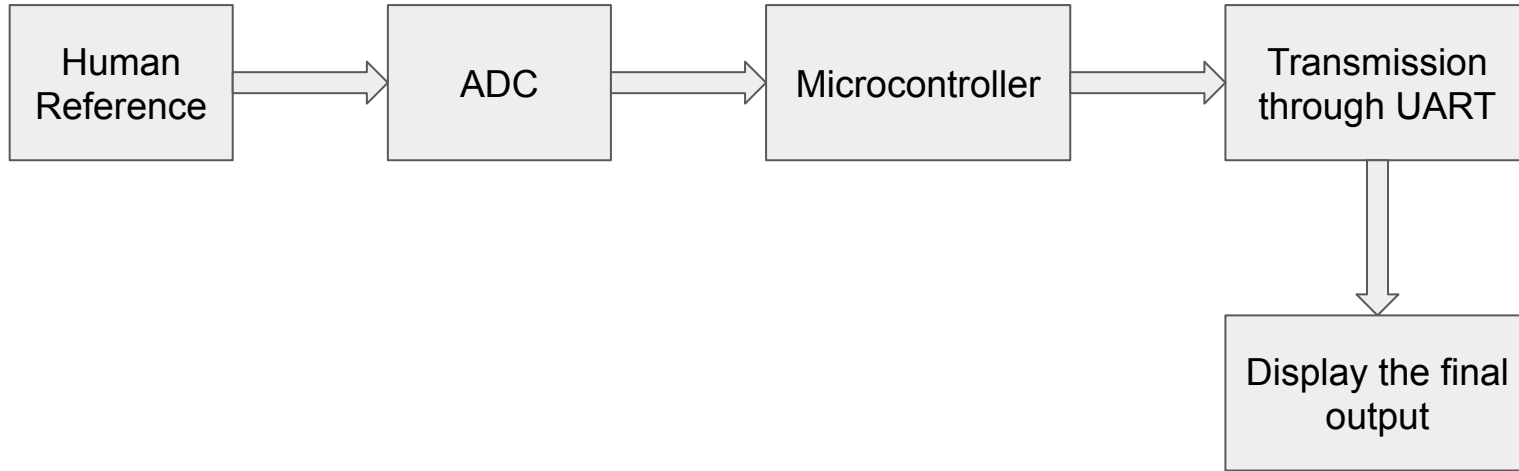# Embedded Project

- <u>Problem Statement:</u>

Implementation of BPM counter ie: the counter for no. of beats per minute from a human body

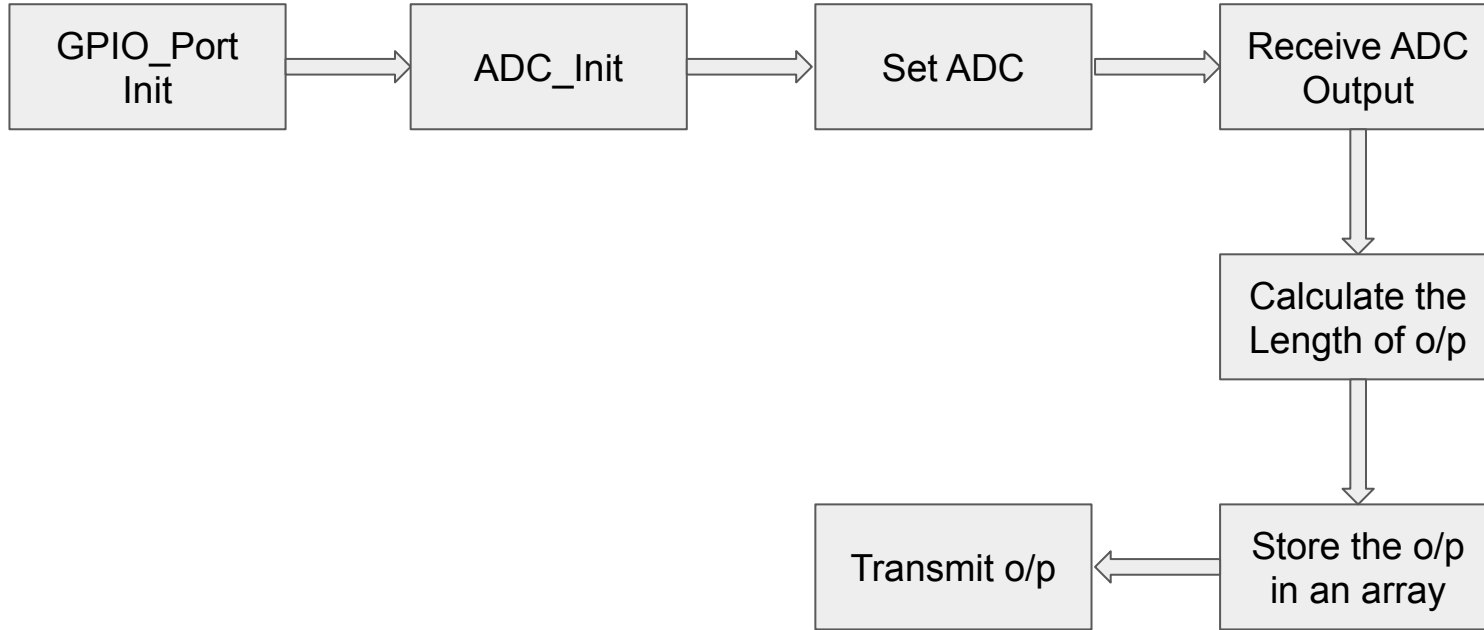The project flow and methodology used is discussed in the next slide

Implementation

```
┌──────────────┐      ┌──────────┐      ┌──────────────────┐      ┌──────────────────┐
│    Human     │ ───▶ │   ADC    │ ───▶ │ Microcontroller  │ ───▶ │   Transmission   │
│  Reference   │      │          │      │                  │      │  through UART    │
└──────────────┘      └──────────┘      └──────────────────┘      └──────────────────┘
                                                                           │
                                                                           ▼
                                                                  ┌──────────────────┐
                                                                  │ Display the final │
                                                                  │     output       │
                                                                  └──────────────────┘
```

Logic Flow

- There are multiple steps which need to be performed for implementing this code.
- The signals from the body lies in the range of 0-1v max.
- The analog signals from the body needs to be converted to digital through ADC built in the microcontroller.
- The processed signal needs to be analysed and perform a level check through which the signal count can be calculated.
- Each count the RED led should glow once.
- The count must be stored in a variable and sent to the computer through serial communication using UART.
- The code flow is as follows,

Logic Flow

```
┌──────────────┐      ┌──────────────┐      ┌──────────────┐      ┌──────────────┐
│  GPIO_Port   │ ───> │   ADC_Init   │ ───> │   Set ADC    │ ───> │ Receive ADC  │
│     Init     │      │              │      │              │      │    Output    │
└──────────────┘      └──────────────┘      └──────────────┘      └──────────────┘
                                                                          │
                                                                          v
                                                                  ┌──────────────┐
                                                                  │ Calculate the│
                                                                  │ Length of o/p│
                                                                  └──────────────┘
                                                                          │
                                                                          v
                                            ┌──────────────┐      ┌──────────────┐
                                            │ Transmit o/p │ <─── │ Store the o/p│
                                            │              │      │  in an array │
                                            └──────────────┘      └──────────────┘
```

Logic Flow

GPIO_Port Init → ADC_Init → Systick_Init → Set ADC

Set ADC → Starts timer of 4 seconds → Receive ADC o/p → Store o/p in an array as characters → Transmit the characters through UART