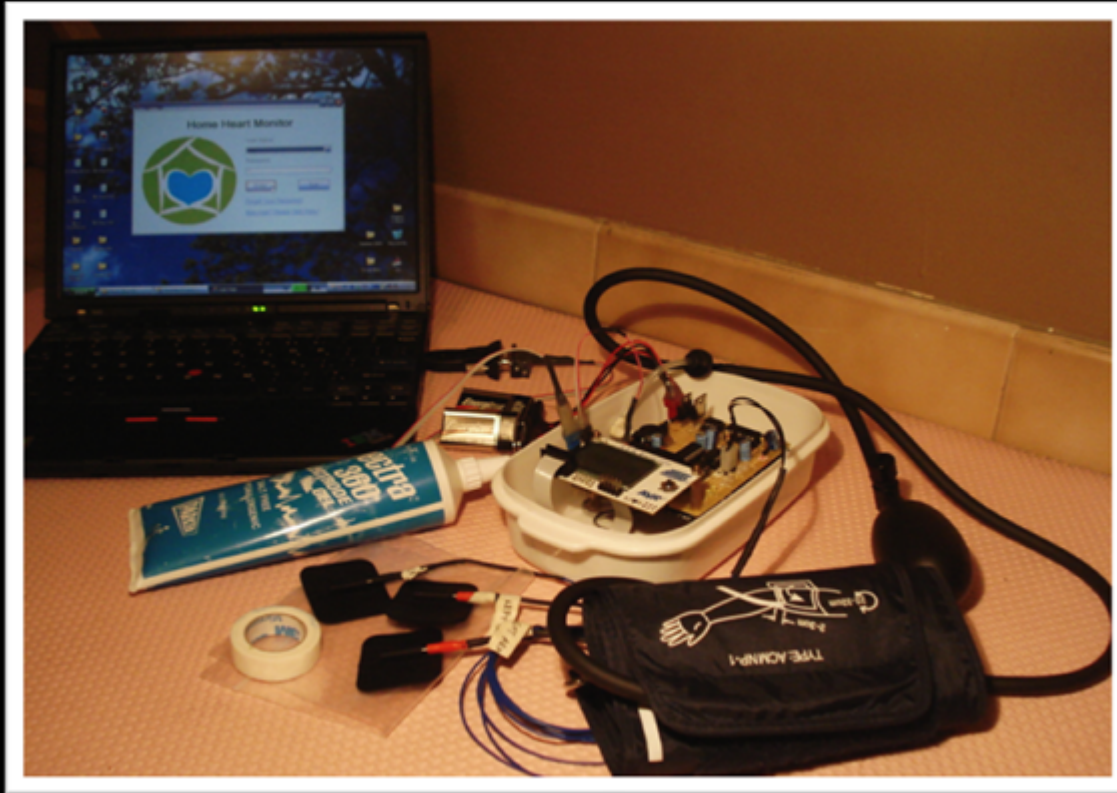


# VHeart Home Heart Monitor



Louise Linggadaja, Lilly Pan,  
Michelle Cua, Sherry Han

# Agenda

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- Introduction
- System Overview
- Hardware Component
- Software Component
- Future Development
- Finances
- Timeline
- Conclusion

# Introduction

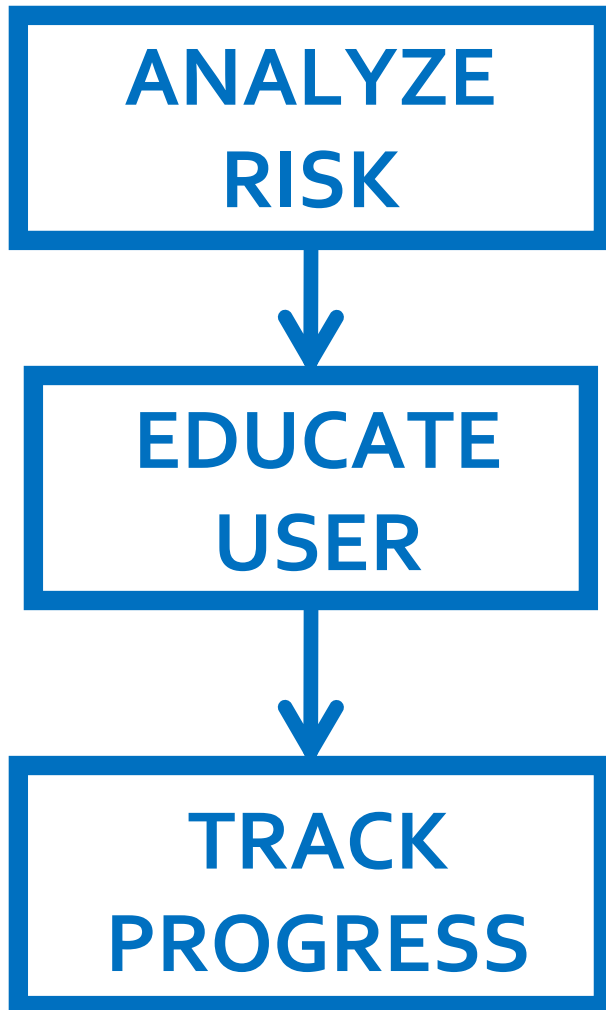
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- Cardiovascular Disease (CVD) is the leading cause of death in North America
- Deaths due to CVD are usually preventable if they are caught earlier on
- Most devices are geared towards monitoring those already diagnosed with CVD

## **Our Goal:**

To Develop a Simple Home Based Device  
That Catches CVD Early to Prevent  
Future Progression

# Goal



- Measure risk of heart disease within next 10 years
- Suggests actions user can take to improve their health and decrease their risk for future CVD.
- Compare change in CVD risk, blood pressure, and body composition over time to show lifestyle effects

# VHeart: Team Members

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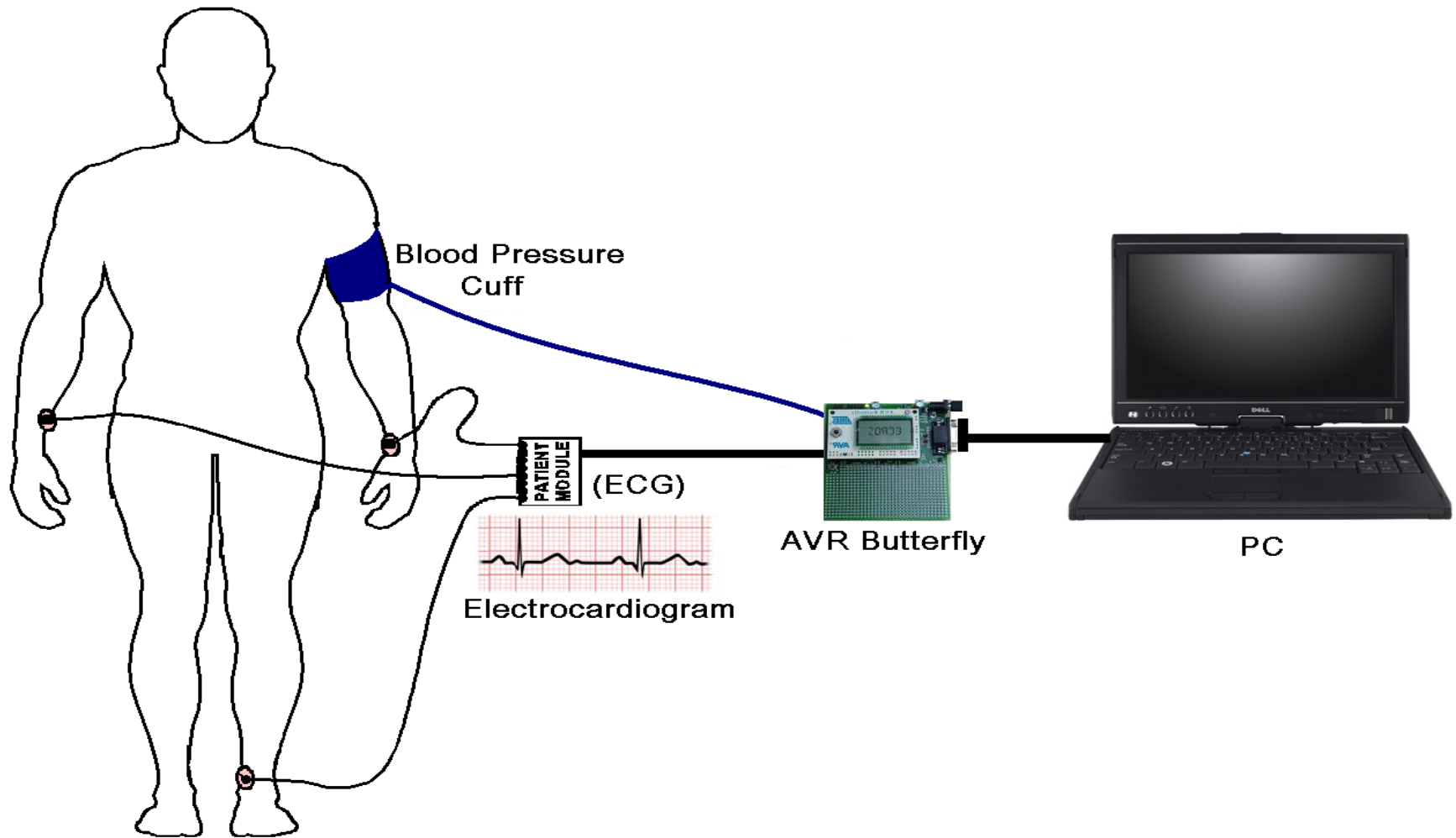
**Michelle:** Project research, Documentation, Software design, Data Analysis, R&D

**Sherry:** Budgeting, Database R&D, ECG research, Material Purchasing, Software GUI design, Testing

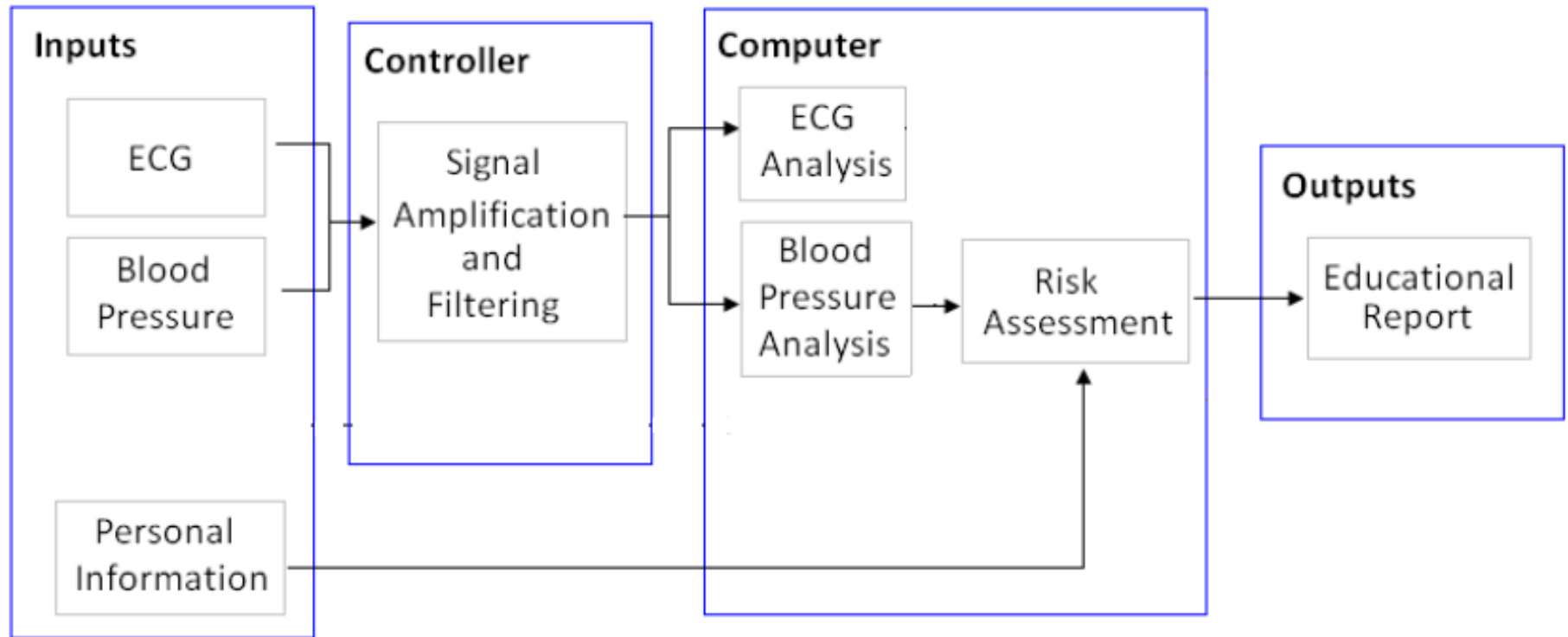
**Lilly:** GUI development, Hardware/firmware design and implementation, Testing

**Louise:** R&D, Documentation, Material Purchasing Hardware/firmware design and implement, Software design

# System Overview

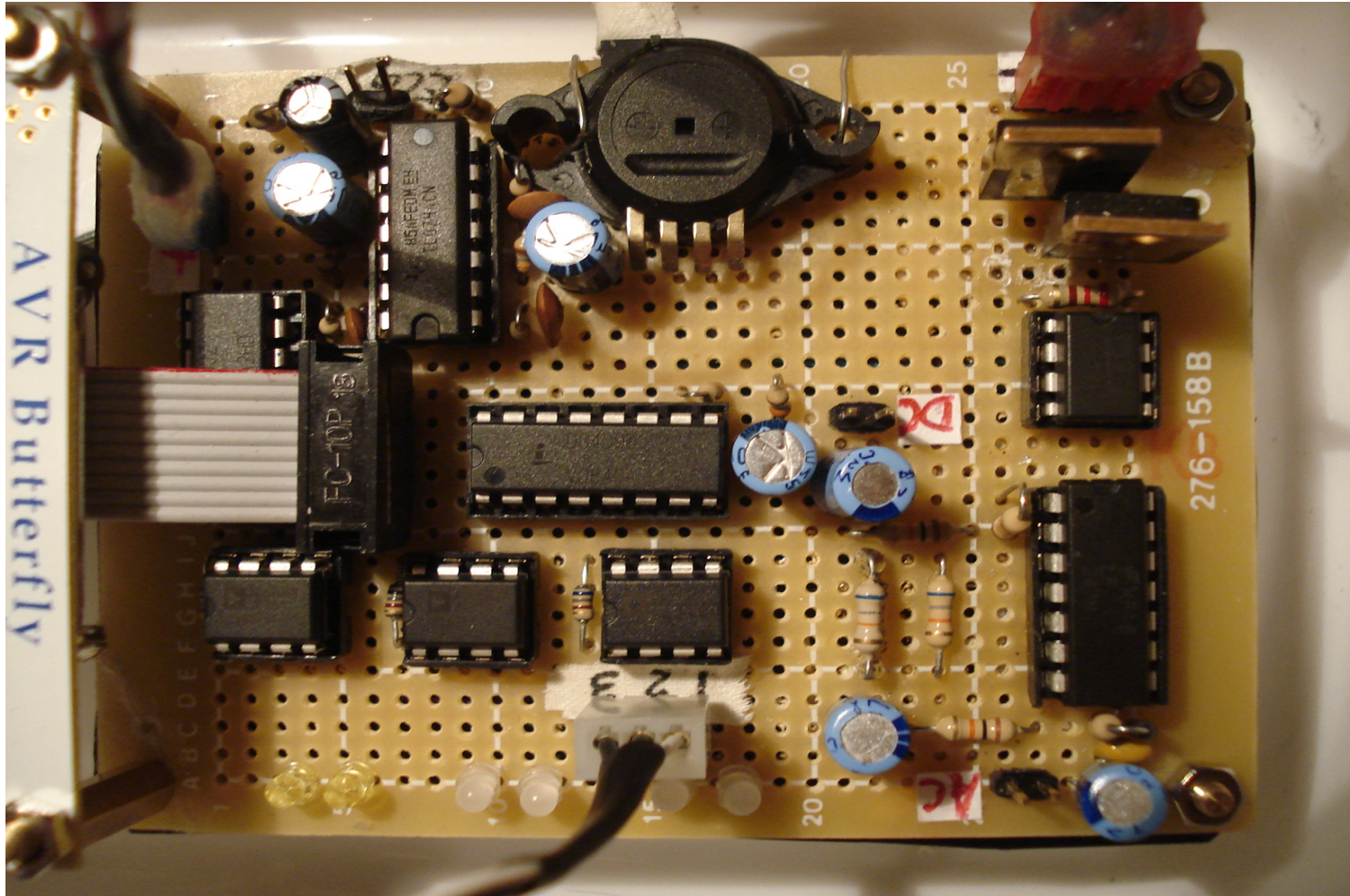


# System Overview - Block Diagram



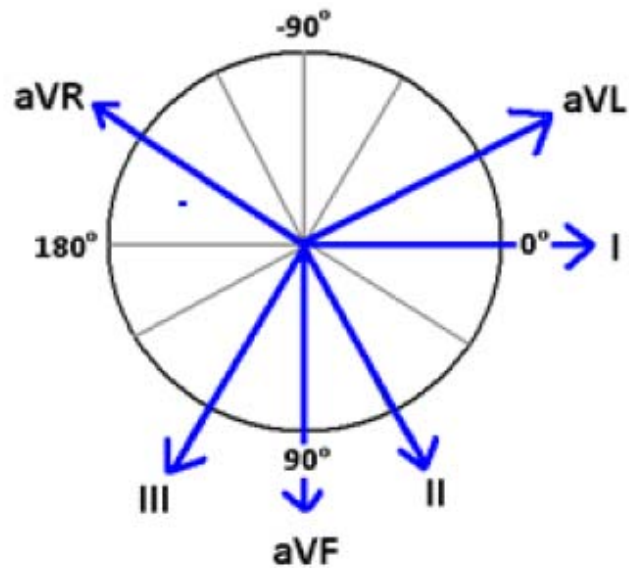


# Hardware - Overview

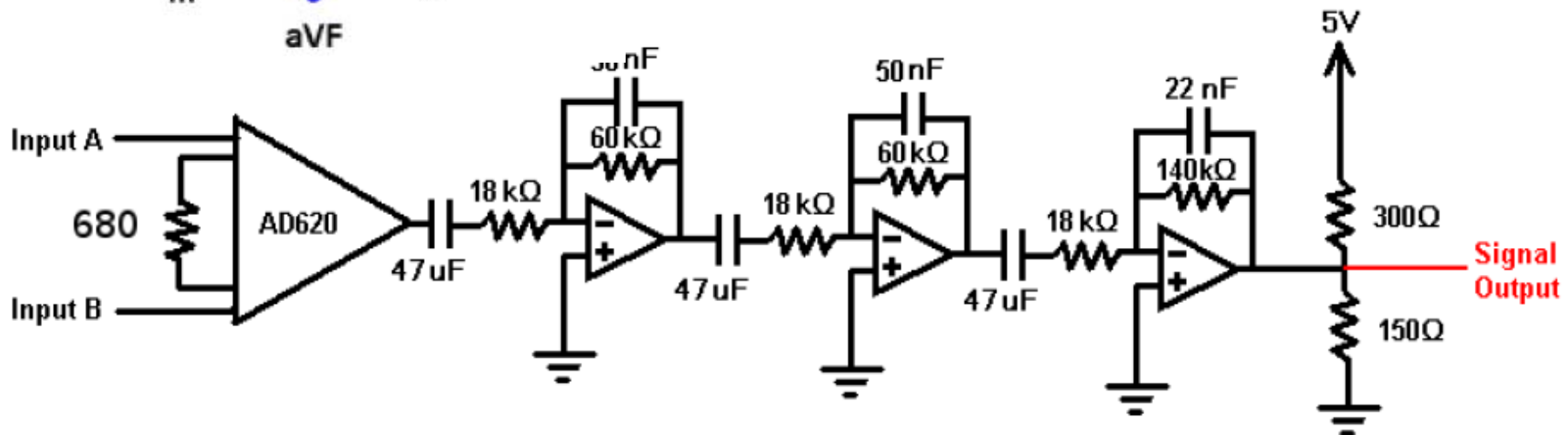




# Hardware – ECG Component

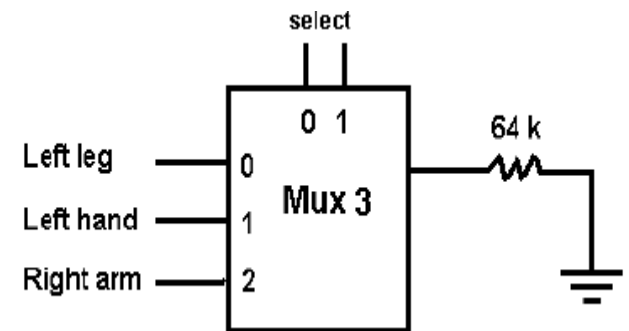
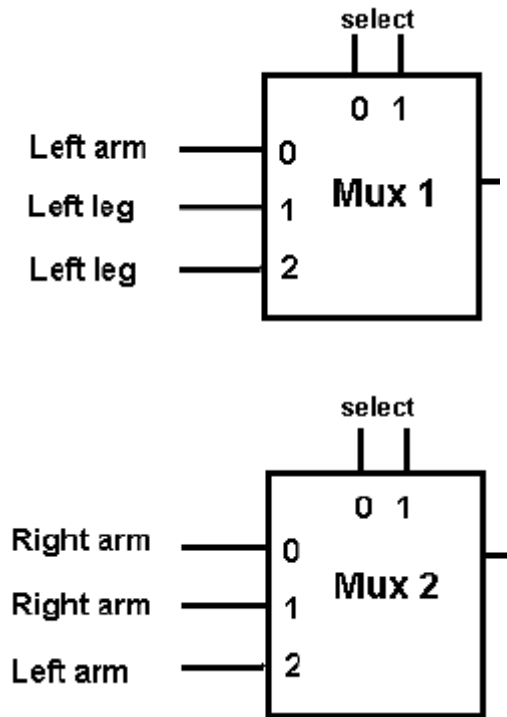
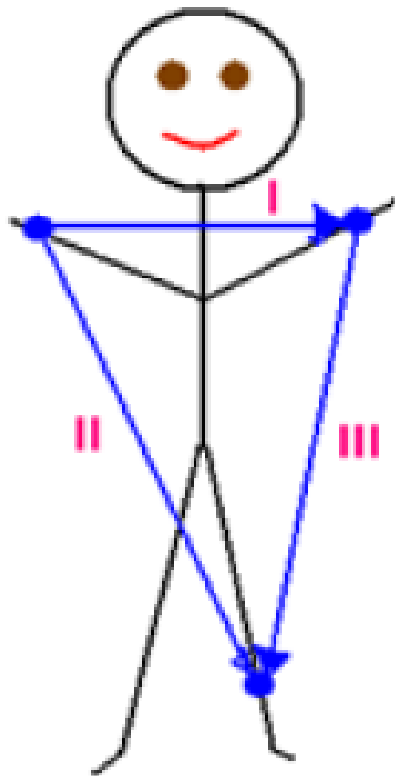


- 3-electrode, 6 lead system

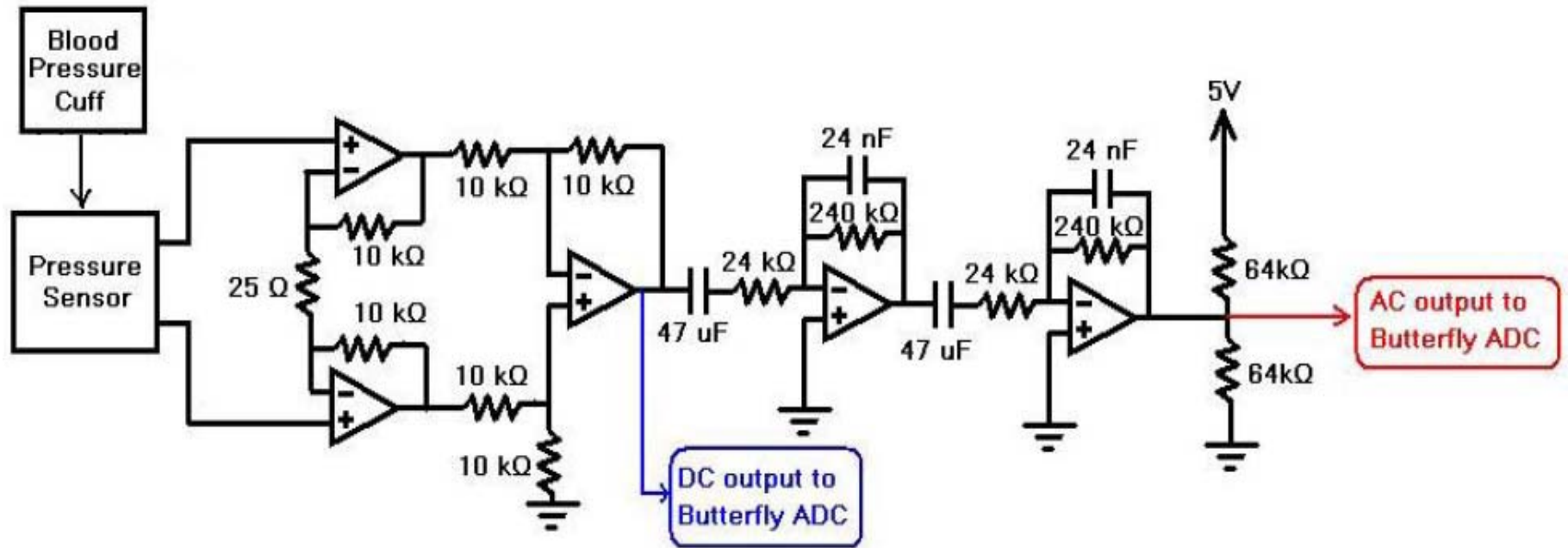


# Hardware – ECG

- MUX is applied to select the input signal

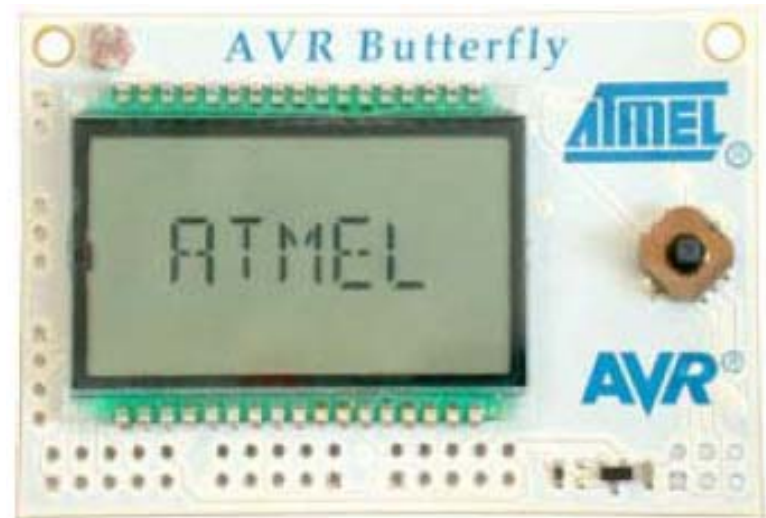


# Hardware – Blood Pressure

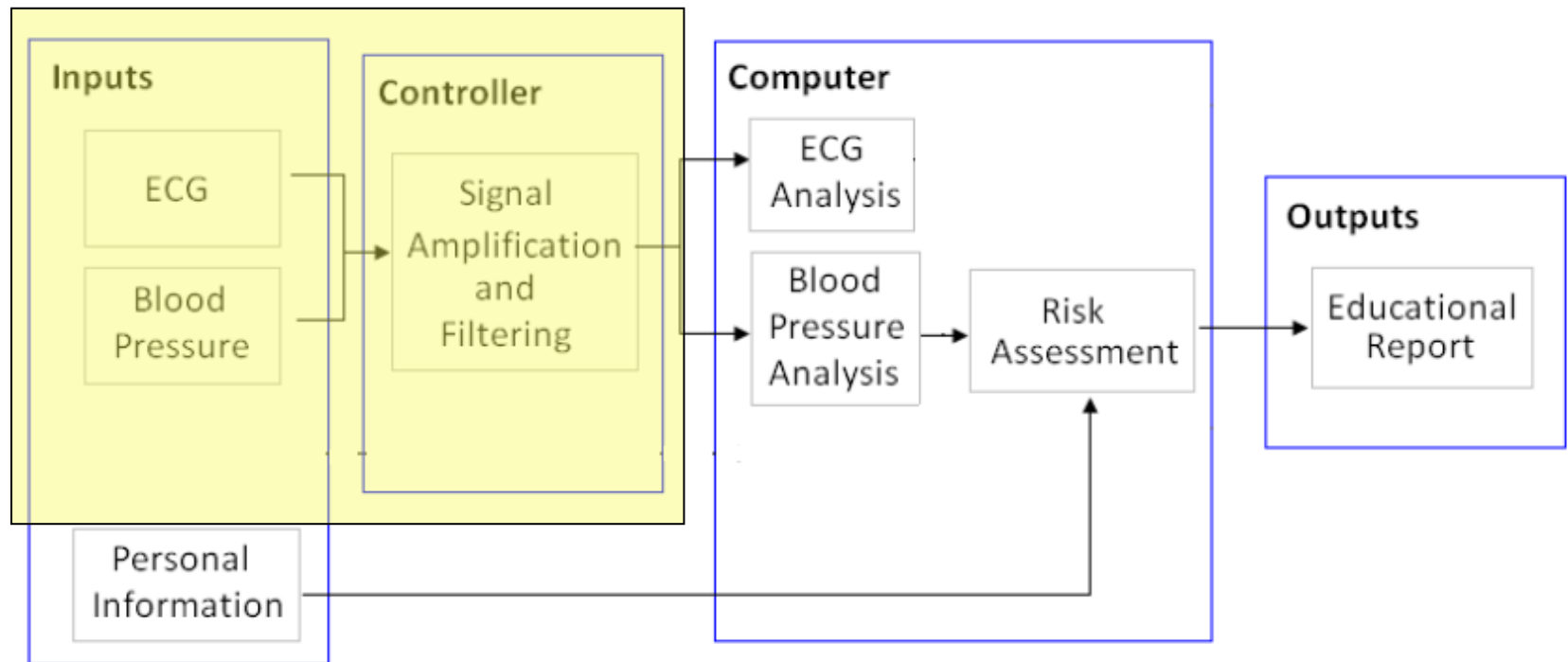


# Hardware – Microcontroller

- Functions used:
  - ADC
  - UART
  - Output Control
  - LCD Display Control
  - Timer
  - Button Function



# Hardware - Summary

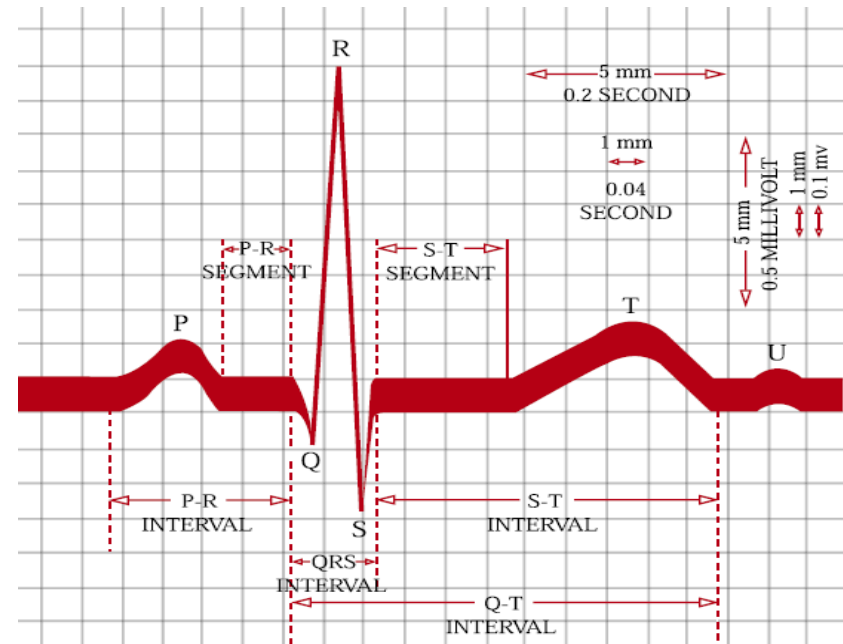


# Software – System Overview

WELCOME TO THE HOME HEART MONITOR

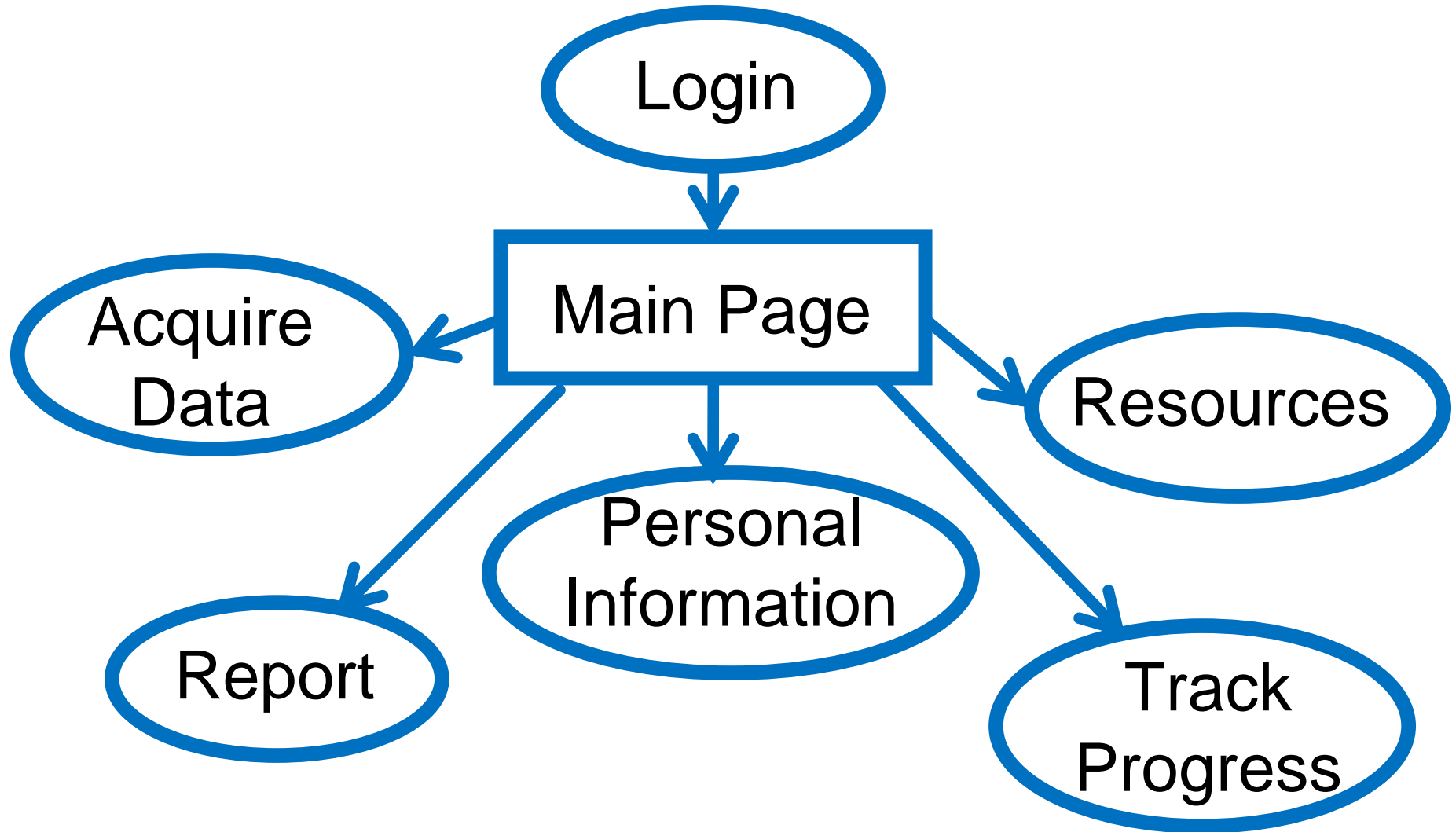
To help us serve you better, please update the following information regularly:

- ♥ ECG and Blood pressure
- ♥ Health information
- ♥ Nutritional information
- ♥ Physical Fitness



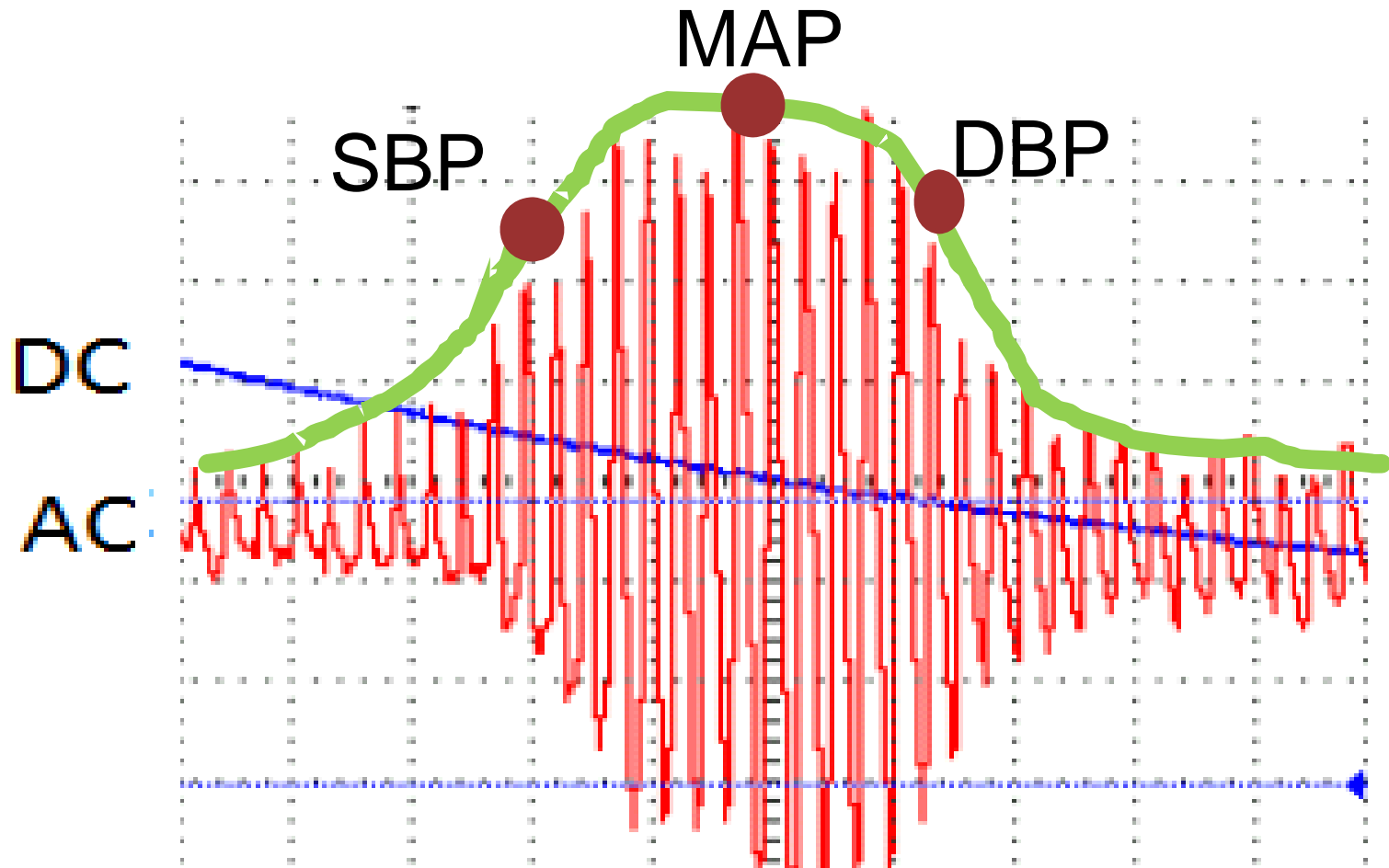
ID	passwd	repasswd	pwquestion	passwdhint	title	firstname
Lilly	123	123	What is your banana			Lilly
Louise	234	234	234	234		Louise
Michelle	123	123	What is your apple			
Sherry	123	123	What is your fish			Sherry
Tom	123	123	Who is your tom			Tom

# Software – Windows Program



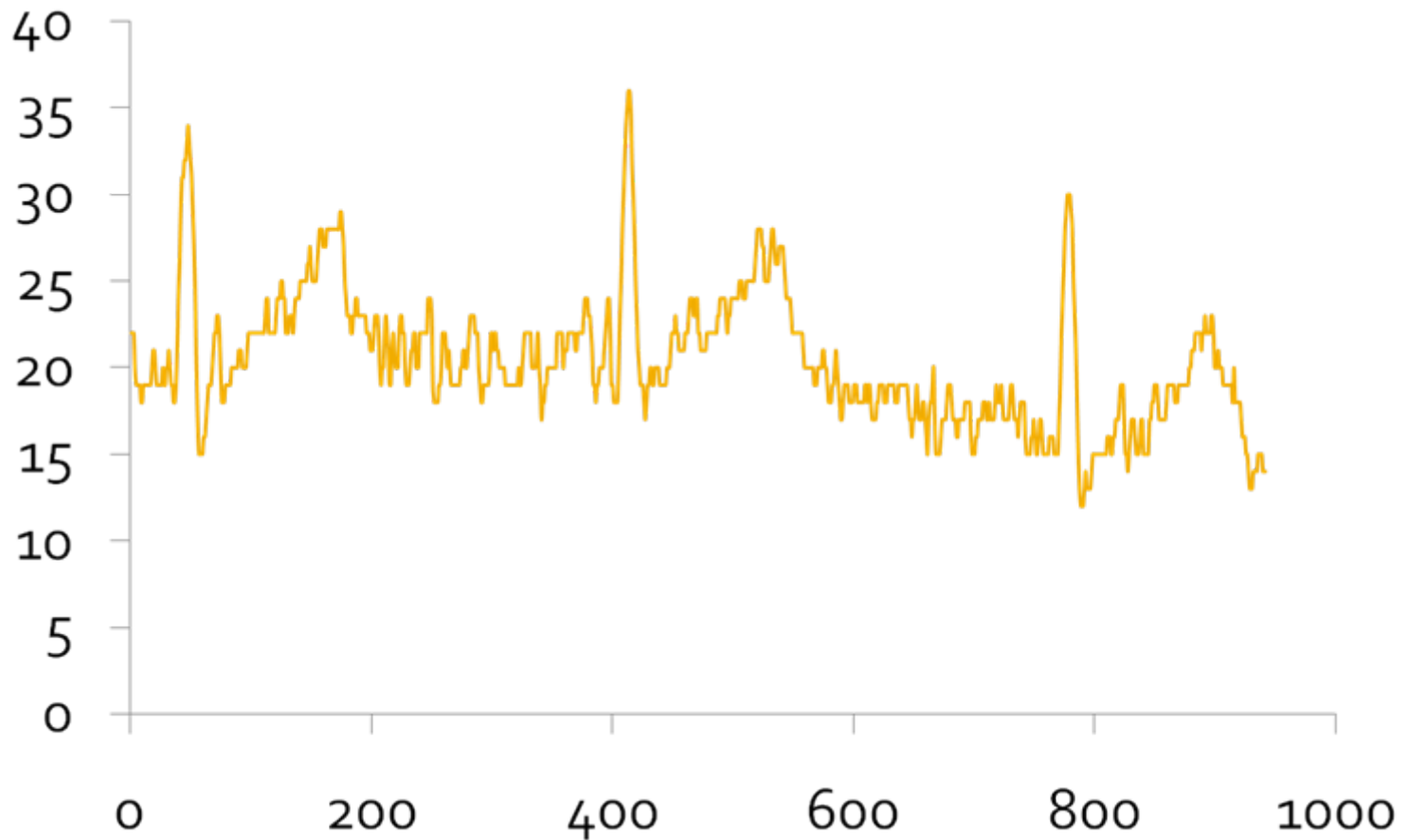


# Software – Blood Pressure Analysis



# Software – ECG Analysis

## Measured ECG Sample



# Software – Database

All Tables

**PersonalTable**

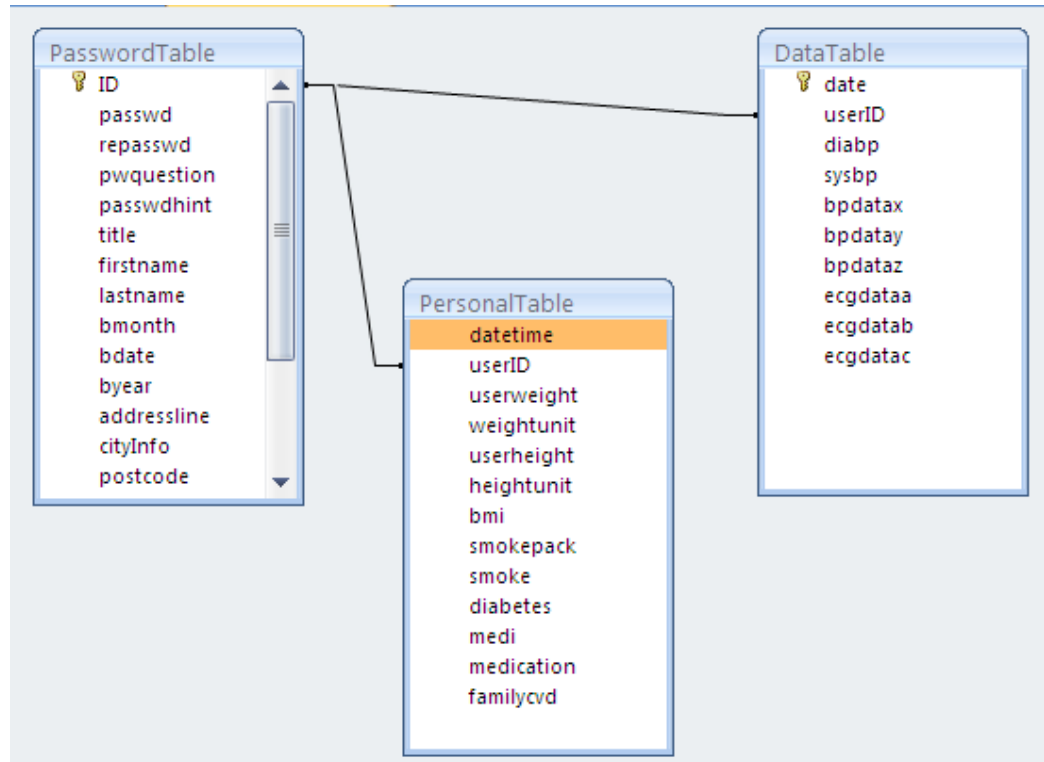
- PersonalTable : Table
- qryData

**DataTable**

- DataTable : Table
- qryData

**PasswordTable**

- PasswordTable : Table
- qryData



ID	passwd	repasswd	pwquestion	passwdhint	title	firstname	lastname	bmonth
Lilly	123	123	What is your	banana	Ms.			
Louise	234	234	234	234	Ms.			
Mary	123	123	123	123	Miss.	marry	wang	February
Sherry	123	123	What is your	fish	Ms.			

# Finance – Proposed Budget

Required Materials <sup>+</sup>	Estimated Cost <sup>+</sup>	
AVR Butterfly <sup>+</sup>	60 CAD <sup>+</sup>	4
Pressure sensor <sup>+</sup>	20 CAD <sup>+</sup>	4
Instrumentation amplifiers <sup>+</sup>	40 CAD <sup>+</sup>	4
Electrodes and connector <sup>+</sup>	20 CAD <sup>+</sup>	4
Electrode Gel <sup>+</sup>	10 CAD <sup>+</sup>	4
Diaphragm Pump <sup>+</sup>	48 CAD <sup>+</sup>	4
9V Batteries <sup>+</sup>	5 CAD <sup>+</sup>	4
3V Batteries <sup>+</sup>	5 CAD <sup>+</sup>	4
<b>Total:</b> <sup>+</sup>	<b>208 CAD</b> <sup>+</sup>	4

# Finance – Actual Budget

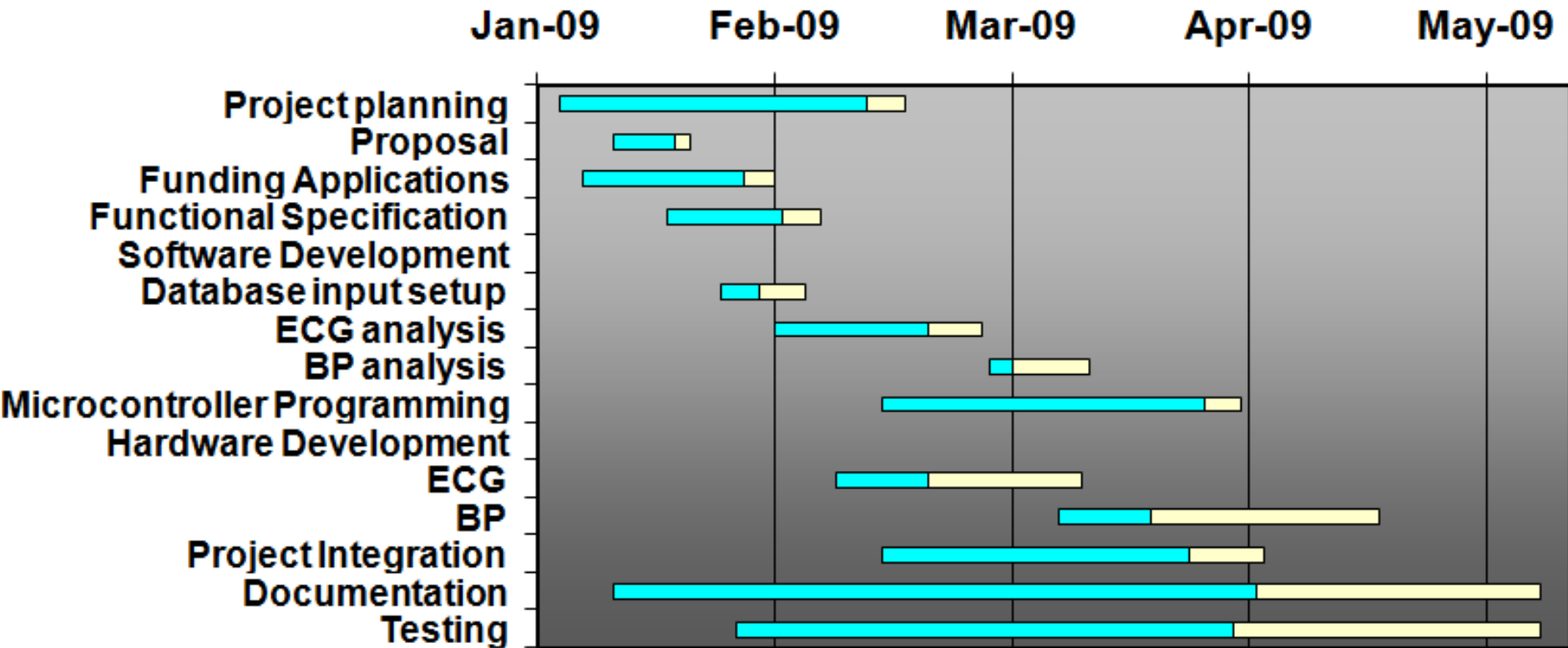
Required Materials↕	Actual Cost (CAD)↕
AVR Butterfly x 2↕	69.00↕
Butterfly Import Tax Charge↕	16.01↕
MPX2050 Pressure Sensor↕	21.75 ↕
4:1 digital multiplexers dip↕	9.36↕
Instrumentation amplifiers↕	41.19 ↕
Shipping fee↕	10.93 ↕
Electrodes and connector↕	27.00 ↕
Electrode Gel↕	Borrowed↕
Capacitors & Resistors↕	Borrowed↕
Diaphragm Pumpx1↕	79.40↕
Import charge↕	46.10↕
9V Batteries↕	7.81 ↕
3V Batteries↕	3.90 ↕
Prototype board↕	10 ↕
Total:↕	342.45↕

# Finance - Summary

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- The actual budget is \$150 over the original budget
- Received ESSS Funding \$100 based on the original budget
- Team members will cover the rest of the cost
- Over Budget Contribute factors include:
  - Have to order the equipment overseas - Butterfly
  - Have to pay the import fees and shipping fees

# Time Line





# Future Development

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- Nutritional Analysis and Physical Activity and Fitness Analysis
- Body fat measurement
- Improve Error Handling for BP and ECG analysis
- Improve processing and data handling to enable system to exist as an independent unit

# Conclusion

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- A tentative prototype has been developed over the course of the last few months .
- The device can help individuals monitor their health on a regular basis by measuring and analyzing their ECG and BP data.
- The device is aimed at reducing the occurrence of health issues related to obesity and CVD through non-invasive measures.
- A future, more accurate and comprehensive device is planned in order to help medical personnel in their diagnosis and treatment .

# Demo



**Any  
Questions?**