**CS3520 Project – Week 5 Deliverable**

**Team Name:** [Insert Team Name]  
**Project Title:** Health Monitoring System  
**Course:** CS3520 – Computer Organisation and Architecture I  
**Date:** [Insert Date]

**1. Introduction**

* Briefly describe the project idea (Health Monitoring System).
* Explain why it is relevant to the **mobile AI telephony context** (low-cost mobile devices with built-in AI can help in healthcare access in Africa/Lesotho).
* State the **overall goal**: design and simulate a RISC-V–based processor that can efficiently support workloads from health monitoring applications.

**2. Domain Analysis (Application Context & Workload Requirements)**

**2.1 Application Context**

* Explain how mobile AI telephony can support healthcare.
* Mention real-world examples: wearables, mobile health apps, emergency alerts.
* Justify relevance for local realities (low-cost, offline capability, energy efficiency).

**2.2 Representative Applications**

* Vital signs monitoring (heart rate, body temperature, oxygen saturation).
* Early detection of anomalies (arrhythmia, fever, hypoxia).
* Data logging and reporting to health workers.

**2.3 Workload Requirements**

Break into categories such as:

* **Data Acquisition:** continuous sampling from sensors.
* **Signal Processing:** filtering noise, extracting trends/features.
* **AI/ML Inference:** lightweight classification, threshold checks, anomaly detection.
* **Communication:** sending data to server/mobile cloud, issuing alerts.
* **User Interaction:** basic mobile display and visualization.

**3. Prototype High-Level Programs**

* Short description of each prototype program and its purpose.
* Example:

**Program 1 – Sensor Data Simulation (C++)**

* Generates random numbers simulating heart rate values.
* Workload represented: **data acquisition**.

**Program 2 – Moving Average Filter (C)**

* Processes an array of readings to remove noise.
* Workload represented: **signal processing**.

**Program 3 – Threshold Classifier (Java)**

* Classifies values as “Normal” or “Alert” based on a set threshold.
* Workload represented: **AI/ML inference**.

**Program 4 – Data Logger (C)**

* Saves readings into a file (simulating transmission/storage).
* Workload represented: **communication**.

**4. Summary and Next Steps**

* Summarize findings: workloads identified, simple programs developed.
* State how this informs ISA customization in Week 6 (hint: need efficient arithmetic, lightweight AI support, and low-power communication instructions).

**Introduction**  
Our project focuses on the design of a **Health Monitoring System** that continuously tracks a patient’s vital signs, issues timely warnings when abnormalities are detected, and provides personalized health improvement tips using AI techniques. This system addresses the urgent healthcare challenges in Africa, particularly in rural areas where medical facilities are scarce and healthcare services are often prohibitively expensive. By leveraging low-cost mobile AI telephony, our solution seeks to make healthcare more **accessible, affordable, and proactive**.

The ultimate goal of this project is to design a **custom RISC-V–based processor** with built-in AI capabilities tailored to the workloads of health monitoring applications. Such a processor will enable efficient handling of sensor data acquisition, lightweight AI inference, and secure communication, ensuring that the system remains both **energy-efficient and reliable** for deployment in resource-constrained environments.