PROJECT OUTLINE

1. Health Monitoring Systems

Core Features:

1. **Heart Rate Monitor**
    - Uses pulse sensors.
2. **Blood Oxygen (SPO2) Monitor**
    - Tracks SPO2 via pulse geometry sensors.
3. **Body Temperature Monitor**
    - Uses thermistor sensors.
4. **Medical Alert Systems**
    - Alerts emergency services.
5. **Multi-Parameter Patient Monitoring**
    - Tracks:
        - Heart rate, blood pressure, SPO2, body temperature.
        - Respiratory rate, blood sugar, weight.

Additional Metrics Tracked (NEEDED Cutter UPS):

- Temperature, height, blood pressure, blood sugar, malaria status, pregnancy status, respiratory rate.

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2. Hardware Components

Displays:

- LCD I^2C 20x4, Dithm TFT, OUTD for weight.

Data Output & Storage:

- **Printed Reports**: Thermal reports.
- **Digital Storage**: Cloud (Google Drive), SD card.
- **Communication**:
    - Email reports to patients.
    - SMS alerts (GSM module: Gm8007).
- **Website**: Monitoring platform.

Sensors & Modules:

- **Malaria/Pregnancy Test**: Color sensor (TCS 34725/ADS-9960), BPH11/BPH3 (Plasmodium detection).
- **ECG/Heart Rate**: AD8232, AD1298.
- **Other Components**:
    - Fixed keypad, pushbuttons.
    - Breadboard, LEDs, 12V power supply (5A), pull-down resistors.
    - Relays (2V), power regulator (2VDC to 5VDC), BCS47 transistor.

3. Health Data Reference Ranges

Parameter	Normal Range	Abnormal Conditions
Body Temperature	97.7°F–99.5°F (36.5°C–37.5°C)	Hypothermia (<35°C), Fever (>37.5°C)
Blood Pressure	<120/80 mmHg	Stage 1 (120–139/80), Stage 2 (≥140/90)
Heart Rate	60–100 bpm	Tachycardia (>100 bpm), Bradycardia (<60 bpm)
SPO2	95–100%	Moderate hypoxia (80–89%), Severe (<80%)
Respiratory Rate	12–20 breaths/min	Tachypnea (>20), Bradypnea (<12)
Blood Glucose	70–110 mg/dL	Diabetes (≥126 mg/dL), Prediabetes (100–125)
BMI	18.5–25.9	-

4. Project Timeline

Phase	Dates	Tasks
Website Development	04-04 to 30-05	Finish website.
Responsive Design	04-25 to 05-25	Build responsive website.
Component Ordering	06-25 onwards	Order hardware components.
Website Testing	06-25 to 07-25	Update web with random test values.
Hardware Integration	08-25 to 10-25	Connect sensors and write sensor code.
Sensor Calibration	11-25	Configure sensors with medical experts.
Project Completion	12-25	Finalize and submit.

Key Takeaways

- **Scope**: Comprehensive health monitoring system with multi-parameter tracking.
- **Tech Stack**: Embedded sensors (SPO2, ECG), cloud/SD storage, GSM alerts, web interface.
- **Clinical Validation**: Sensor calibration with practitioners ensures accuracy.
- **Timeline**: 8-month development cycle (April–December 2025).