Modeling Project

Project Name:

A personal insulin pump

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# Introduction

## Objective

## Asimulation system an insulin pump used by diabetics to maintain blood glucose control.

* **This system aims to ease the measurement of blood sugar and dealing with this measurement in a way that puts the patient in a safe state.**

## Document Conventions

* **Provide all objective.**
* **Provide security and its priority is higher than anther object.**
* **The system design is good view&easy to use.**
* **Use DB & put DB on server.**
* **The system is fast in insert & searches the data.**
* **Doing statistics well are based data collection.**

## Intended Audience

* **Client Managers**
* **Contractor Managers**
* **System End-User**
* **Client Engineers**
* **System Architects**
* **Software Developers**

# Requirements

## User Requirements

* **The system should periodically measure blood sugar to determine the patient’s state and deal with it.**

## Systems Requirements

* **Depending on the state of the patient the system should measure the blood sugar.**
* **The system should maintain the previous measurements to determine the cumulative sugar of the patient.**
* **The system should send a notification periodically to tell the patient about its state.**
* **The system should tell the patient if its state need a doctor or he needs to go fast to hospital**.

## Functional Requirements:

* **Our system is determined to help diabetes patients to keep their level of sugar stable.**
* **The system reads the blood sugar by blood sensor and analyze this reading  
   to measure sugar level.**
* **the system computes the suitable insulin dose and pumps it to the patient when needed.**
* **the system uses database to store patient’s dataand store previous sugar readings**

### Form-Based Specifications:

|  |  |
| --- | --- |
| Function | Computes insulin dose for Safe sugar level. |
| Description | Computes the dose of insulin to be delivered when the current measured sugar level isn’t in the safe zone and the sugar level is increasing and the rate of increase is increasing. |
| Inputs | Current sugar reading (d2), the previous two readings (d0 and d1). |
| Source | Blood sensor and memory. |
| Outputs | The dose in insulin to be delivered – redoes. |
| Destination | Insulin dose computing loop. |
| Action | Redoes is zero if the sugar level is stable or falling. If the level is increasing and the rate of increase is increasing, then redoes is computed. If the result, is rounded to zero then redoes is set to the minimum dose that can be delivered. |
| Requires | Two previous readings so that the rate of change of sugar level can be computed. |
| Pre-condition | The insulin reservoir contains at least a sufficient single dose of insulin. |
| Post-condition | Getting the three readings (d0, d1, and d2) respectively |
| Side-effects | None. |

# 2.3.2 TabularSpecifications:

|  |  |
| --- | --- |
| Condition | Action |
| Sugar level falling (d2 < d1) | Redoes = 0 |
| Sugar level stable (d2 = d1) | Redoes = 0 |
| Sugar level increasing and rate of increase decreasing [(d2 – d1) >= (d1 – d0)] | Redoes = 0 |
| Sugar level increasing and rate of increase is increasing [(r2 - r1) >= (r1 – r0)] | Compute redoes and if the result rounded to zero then redoes = minimum dose. |

## Nonfunctional Requirements:

* **The system shall be available to thetime (system is working 24 hours).**
* **The system shall work speed of execute all function**
* **The system shall Has high accuracy in calculating the patient's gears.**
* **The system shall work on any devices.**

### Product requirements

* **The system needs to make backup for data that the user recently adds to the system**

**So, the system will start at the end of the day after the last examination to store recently added data in the server a time depending on the amount of data**.

### Organisational requirements

* **The user should create an account to login into the system to be aware of its state and to manage his data.**

### External requirements

* **The system should provide patient privacy so that every patient has its own data and can’t enter others data**.

**USE CASE:**

