# Use cases description

## Sugar levels

* Sugar level rising (at alarming rate) -> Release insulin
* Sugar level falling (at alarming rate) -> Prompt user to consume sugar
* Warning to consult doctor if levels are below 4 or above 7

## System Status

* Low battery -> Prompt user to charge device or have battery replaced
* Low insulin reservoir levels –> Prompt user to have reservoirs refilled
* Defect / Error / routine maintenance service-> Prompt user to have device replaced

## Log for monitoring patient

* Blood sugar / time
* Insulin level / time
* Insulin released by pump / time

# Use Case Scenarios

## Scenario 01: Blood sugar level rising at alarming rate

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| Nr. and Name: | 01 Blood sugar levels rising |
| Scenario: | Blood sugar levels are projected to exceed the upper bound, thus insulin is released. |
| Short Description: | Monitoring of blood sugar levels detecting a rise in the blood sugar. |
| Actors: | Fat Karl (Patient), Insulin pump, Display, Blood scanner, Analytics Unit |
| Starting Event and Preconditions: | Growth of the blood sugar levels indicates an increase of the blood sugar levels above the upper boundary within an amount of time x. |
| Result and Postconditions: | Insulin is released growth of the blood sugar level decreases over an amount of time y and stabilizes after a defined amount of time z. |

Steps:

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| Nr. | Actor | Description |
| 0 | Blood scanner | Blood scanner continuously records blood sugar levels |
| 1 | Fat Karl | Fat Karl consumes to much sugar (Doughnuts) |
| 2.1 | Analytics Unit | Analytics Unit project the blood sugar levels to exceed the upper bound within x amount of time. |
| 2.2 | Analytics Unit | Analytics Unit calculates the amount of insulin, that is required to counteract the rise in blood sugar levels |
| 3 | Insulin pump | Insulin is administered by the Insulin pump |
| 4 | Analytics Unit | Analytics Unit monitors blood sugar levels   * If blood sugar levels continue to rise -> 2.1 * If blood sugar levels are projected to stabilize -> 5 |
| 5 | Display | Display displays -> “Blood sugar levels stabilized” |
| 6 | Fat Karl | Fat Karl acknowledges display readout |
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Exceptions, Variants:

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| Nr. | Actor | Step |
| 0.1 | Blood scanner | No blood sugar levels detected |
| 2.1.1 | Analytics Unit | Calculation exception |
| 2.2.1 | Analytics Unit | Not enough insulin in reservoir |
| 3.1 | Insulin pump | Pump is unable to pump insulin |
| 4.1 | Analytics Unit | Blood sugar levels dropping too quickly |
| 4.2 | Analytics Unit | Blood sugar levels rising too quickly |
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## Scenario 02: Blood sugar level falling at alarming rate

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| Nr. and Name: | 02 Blood sugar levels falling |
| Scenario: | Blood sugar levels are projected to drop below the lower bound, thus the user is requested to consume more sugar. |
| Short Description: | Monitoring of blood sugar levels detecting a drop in the blood sugar. |
| Actors: | Paul Thin (Patient), Display, Blood scanner, Analytics Unit, Alarming System |
| Starting Event and Preconditions: | Blood sugar level has decreased below the lower boundary within an amount of time x. |
| Result and Postconditions: | The alarming system is triggered, the user is required to consume sugar as soon as possible. The alarm only stops when the user notices it. |

Steps:

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| Nr. | Actor | Description |
| 0 | Blood scanner | Blood scanner continuously records blood sugar levels |
| 1 | Paul Thin | Paul Thin does not consume any sugar for too long |
| 2.1 | Analytics Unit | Analytics Unit project the blood sugar levels to exceed the upper bound within x amount of time. |
| 2.2 | Analytics Unit | Analytics Unit calculates the amount of glucose, that the user is required to consume instantly |
| 2.3 | Alarming System | The alarming system is triggered and keeps going until the user interacts |
| 3 | Paul Thin | Paul Thin reads the amount of glucose he has to consume |
| 3.1 | Paul Thin | As soon as the glucose is consumed, Paul disables the alarm |
| 4 | Analytics Unit | Analytics Unit monitors blood sugar levels   * If blood sugar levels continue to drop -> 2.1   If blood sugar levels are projected to stabilize -> 5 |
| 5 | Display | Display displays -> “Blood sugar levels stabilized” |
| 6 | Paul Thin | Paul Thin acknowledges display readout |
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Exceptions, Variants:

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| --- | --- | --- |
| Nr. | Actor | Step |
| 0.1 | Blood scanner | No blood sugar levels detected |
| 2.1.1 | Analytics Unit | Calculation exception |
| 4.1 | Analytics Unit | Blood sugar levels dropping too quickly |
| 4.2 | Analytics Unit | Blood sugar levels rising too quickly |
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