

# Water Management System for In-house Applications



**Ibrahim Alhajji** (MSE)  
**Ahmed Alali** (CHE)  
**Mohammed Alhubail** (CHE)

**Hussin Altaruti** (ME)  
**Mohammed Alshehri** (ME)  
**Ibrahim Alnowaser** (ISE)

**Coatch: Dr. Maged Abdelsamie**

**TEAM 22**

## Introduction/Background

### Background

In winter, when you turn on the tap for hot water, it often starts cold, making you wait until it warms up. In summer, it's the opposite - starting hot and turning cold. This waiting game not only wastes water but also your time. Many people let taps run while waiting, wasting around 30 gallons of water every day. That's over 11,000 gallons in a year!

### Problem Statement

Design and optimize a water management system, that will be mainly used in households, to prevent wasting tap water caused by waiting for the water to reach the desired temperature.

### Constraints

- Budget Limitations
- Weather Conditions
- Operational Requirements
- Technology Availability

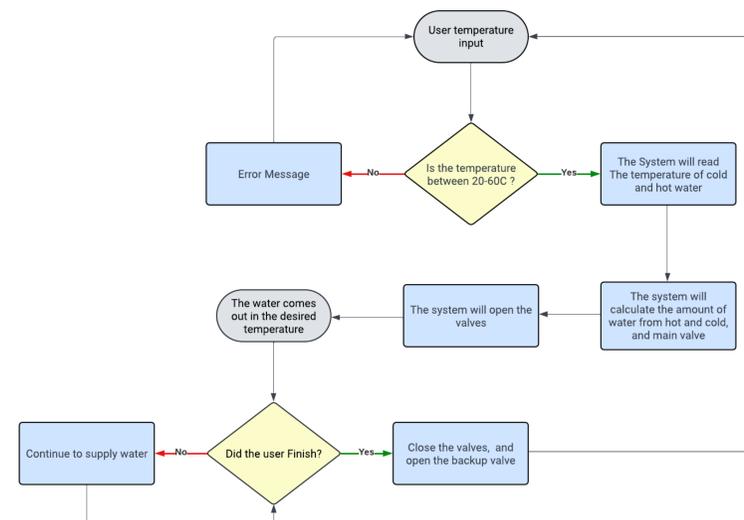
### Target Specifications

- Delivery Time (1-2 seconds)
- Allowable Range Temperature of Water Delivered (20-60 °C)
- Reduction of Water Waste (1 gallon per year)
- Cost of saved water waste (112.5 Riyals per unit)

### Project Impact

- Economical: Reduce the cost of water bills
- Environmental: Conserving water through recycling and reutilization
- Social: Increasing water security and financial savings

## Prototype Design



## Testing / Validation

The final Water Management System design successfully meets the engineering specifications outlined for the project:

**User-Friendly Interface:** The Matrix Keyboard and screen were refined through usability studies for an optimized user experience.

**Water Conserving:** The designed system conserves water by 90% of the current systems.

**Temperature Range:** The system gives wide ranges of temperature starting form 20 °C up to 60 °C.

**Delivery Time:** The system ensure that the water will reach the customer within 1-2 seconds.

## Conclusion

In conclusion, the development of the Water Management System for In-house Applications for our senior project has been a significant achievement. This project aimed to optimize the water consumption and ensure that the customer will have his preferred temperature within seconds.

We successfully designed, implemented, and tested a comprehensive system that effectively gives the coatomer his preferred temperature and conserves water.

The system's success has promising implications for reducing water waste and enhancing the customer experience.