

WASH PORT

The Smart Washing Machine

THE PROBLEM

- Use of Plastics has become indispensable due to its durability, anti-corrosive properties.
- Plastics take years to decompose and pose a major threat to our environment.
- The build up of plastic in our oceans is a greater cause of eco-system disruption. An estimated 100,000 marine animals die each year from suffocating on or ingesting bags.
- Dioxin and other toxins can leach out of landfills, further contaminating water bodies.

A DEEPER SIGHT INTO THE PROBLEM

- A harmful plastic product almost every woman in urban areas use is the menstrual pad.
- An average woman attains maturity at about 13-16 years of age and the menstrual cycles exceed till she is 50-55 years when menopause occurs. The menstrual cycle happens every 21-35 days and uses about 3 napkins each day for about 7 days. **On an average a women uses 10080 napkins in her lifetime. This costs Rs.201600 and weighs 108 kilograms.**
- Environment portal Down to Earth estimated that **432 million pads are disposed every month**. Each of these napkin takes about **400-800 years to decompose** as it made of non-biodegradable plastics and synthetics heavily treated with chemicals and when burnt produces **billions of tons of CO₂** adding to global warming and pollution.

RESEARCH

- Environment portal Down to Earth estimated that **432 million pads are disposed every month**. Each of these napkin takes about **400-800 years to decompose** as it made of non-biodegradable plastics and synthetics heavily treated with chemicals and when burnt produces **billions of tons of CO2 adding to global warming and pollution**.
- The 100 percent organic **cotton pad, burns slow and clean**, leaving virtually no sooty residue. But the conventional one creates **black smoke and thick residue**, indicating the pad may contain **dioxins, synthetic fibers and petrochemical additives**. (Video in the presentation.) Studies show **dioxin collects in your fatty tissues**. According to an EPA draft report, dioxin is a serious public health threat that has **no “safe” level of exposure!** Published reports show that even trace dioxin levels may be linked to:
 - **Abnormal tissue growth in the abdomen and reproductive organs**
 - **Immune system suppression**
 - **Hormonal and endocrine system disruption**

SOLUTION

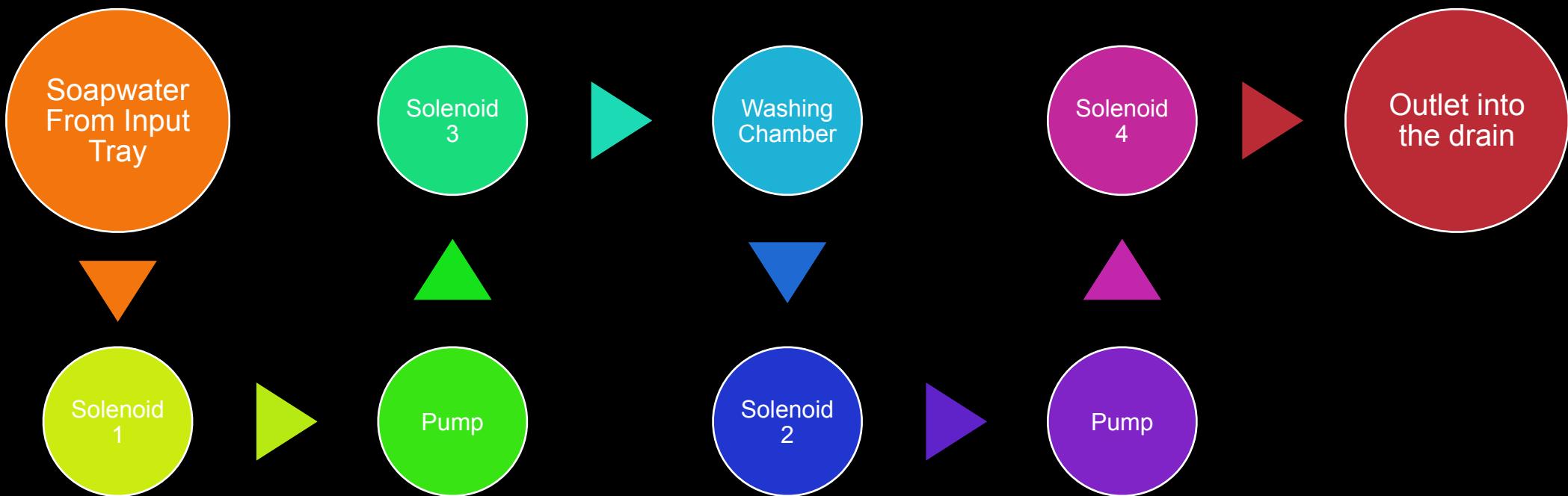
- An easy and ecofriendly alternative to this is **using cotton cloth**. Cotton cloth which is used can be very easily reused and has many advantages such as less toxic materials, less irritation and prevents other side effects of hard chemicals used in sanitary napkins.
- The Wash Port can be used as a machine to wash these cotton cloths **isolated from other cloths in the house**.
- Design focuses on

A compact fully automatic machine which uses lesser water and consumes lesser power.

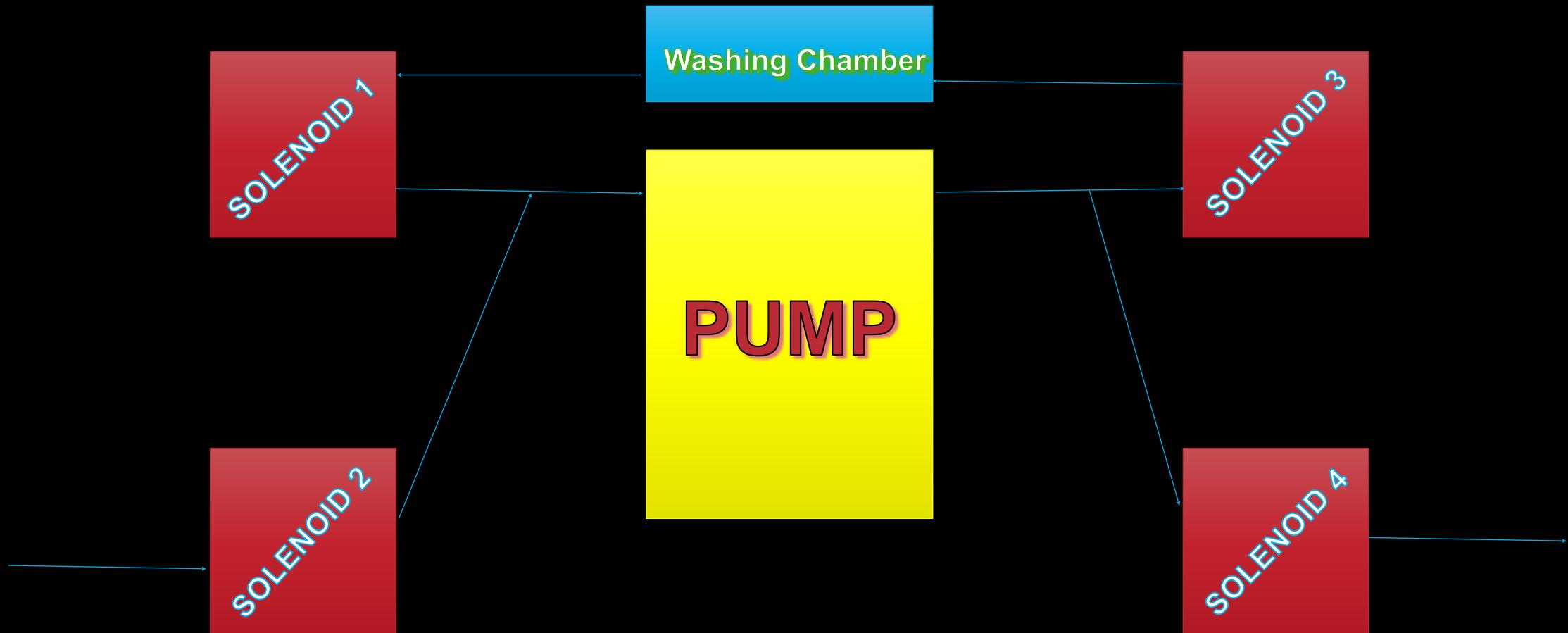
MATERIALS

Materials	Quantity	Purpose
Raspberry Pi	1	For Controlling the Wash Port
8 Relay Board	1	To Switch the Solenoids and Pump
AC-DC 24V Supply	1	To Power the Pump and Solenoids
DC Motor	1	To Make the Drum Spin
Pump	1	To Pump the Water in and out
Solenoid	4	To Allow the Inflow of Water
Drum and Washing Chamber Box	1	To Wash the Clothes(Cotton Menstrual Pads)

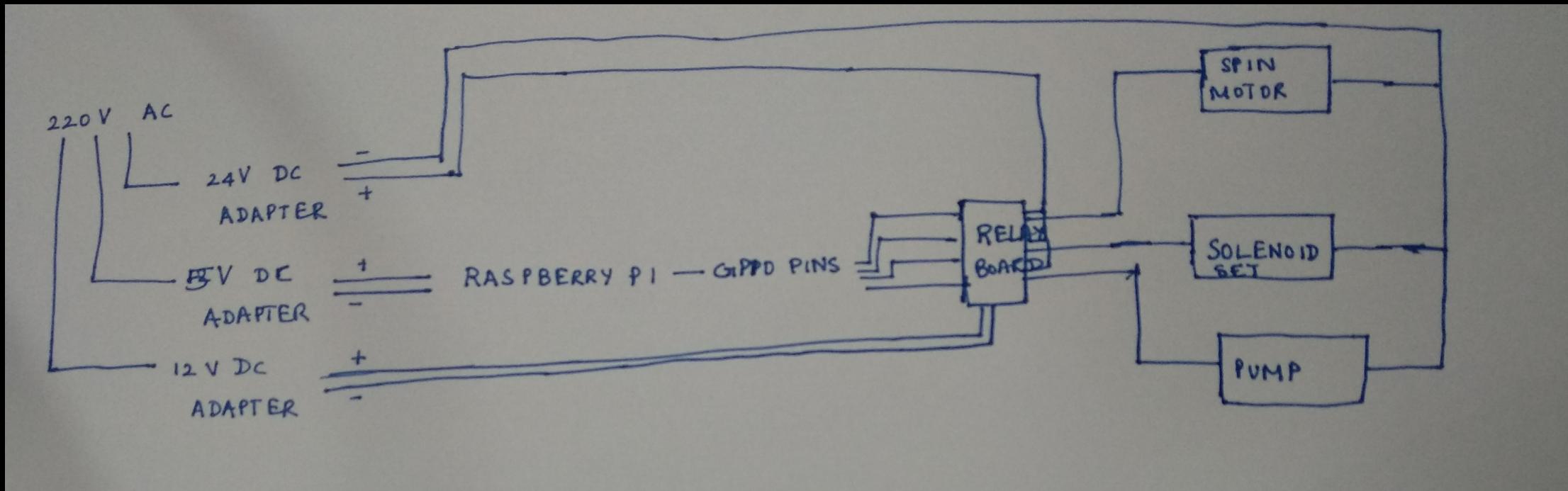
OVERALL WORKING FLOWCHART



WATER FLOW- BRIDGE MECHANISM



CIRCUIT DIAGRAM



ELECTRICAL COMPONENTS

The relay board helps us to control the switching on and off of the components. It switches the 24V DC from the AC-DC adapter Power Supply.

The GPIO pins are connected to the relay board which in turn controls the components.

The solenoids are electromagnetic valves which regulate the flow of water in and out of the wafer chamber.

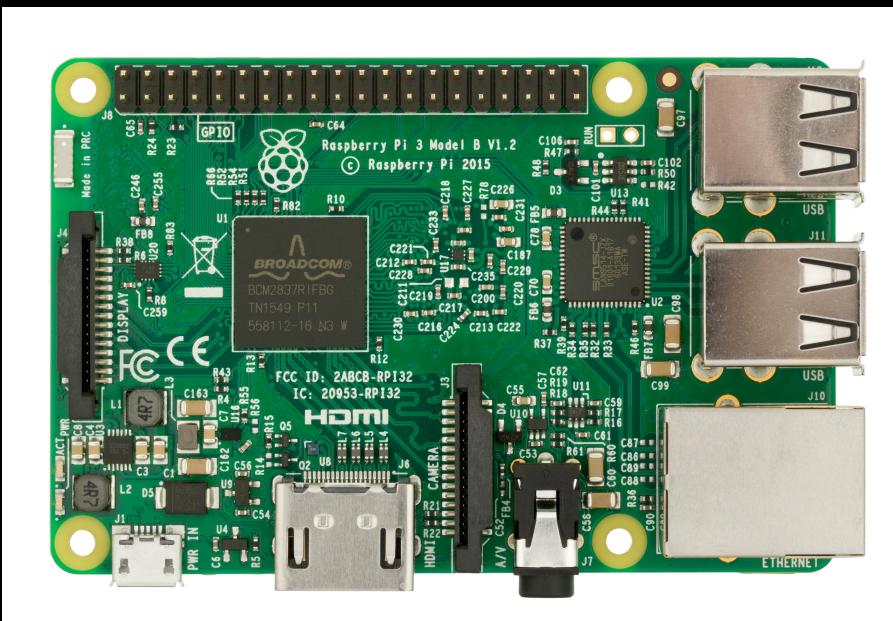


The pump along with the solenoid system helps pumping water in and out.



PROGRAMMING

We have used Python-3 for the user interface using GPIO pins from the Raspberry Pi-3. The GPIO pins allow us to control the solenoid valves, working of the pump and motor. During different protocols the pins are assigned several functions which enables WashPort to be an automatic washing machine. The Raspberry Pi is the brain of the project.



CONCLUSION

- Increased usage of plastics is a rising issue. Alternatives must be found to save Earth's environment from deadly plastic.
- As menstrual pads are used by women living across the globe Wash Port will have a huge impact on the world if they were made more user friendly. Wash Port encourages the use of cloth pads.



FUTURE DIRECTIONS

DESIGN

- Currently the design enables washing of 3 – 4 pads at a time.
- Modification of Design to enhance the capacity to wash 6 – 8 cloth diapers used for babies

TECHNOLOGY

- Add features that collects data and send to a cloud based service for data analytics.

BIBLIOGRAPHY

- https://www.huffingtonpost.com/dr-mercola/feminine-hygiene-products_b_3359581.html
- https://www.youtube.com/watch?v=4vwQpe3CCH4&feature=player_embedded
- <https://www.raspberrypi.org>
- <https://timesofindia.indiatimes.com/india/70-cant-afford-sanitary-napkins-reveals-study/articleshow/7344998.cms>