**Monero Mining Project**

**on a Raspberry Pi 3B**

**Objectives**

The objectives of this project were to:

- Set up a Raspberry Pi 3B to mine Monero (XMR) crypto tokens.

- Explore the process of crypto mining.

- Observe and analyse the hardware resources usage.

**Hardware and Software Setup**

The hardware including the Raspberry Pi 3B, a power supply, an SD card, an Ethernet cable, and required cooling material.

The software includes the latest version of Raspbian OS, the Xmrig mining platform, Putty, WinSCP, and Filezilla.

**Monero, the Cryptocurrency**

- Monero is a decentralized digital cryptocurrency that specializes in privacy.

- Only the sender and recipient of a Monero transaction can know the details of that transaction.

- People use Monero primarily as an investment, although it can also be used to make payments.

**Mining Process Overview**

- Mining involves solving complex mathematical calculations to verify blocks of transactions on the blockchain.

- In return for their efforts, miners earn cryptocurrency.

- The computational effort required to mine depends on the mining algorithm.

- Monero utilizes the RandomX algorithm, which consumes significant amounts of computational power.

**Mining Configurations**

- The Raspberry Pi's CPU was overclocked to offer maximum performance.

- A config file was used to define various parameters such as the mining pool, wallet address, and intensity.

- Worker threads were set to 4 to keep the CPU occupied without exceeding maximum temperatures.

- The minimum valid share difficulty was set to a low value considering the Pi's low computational power.

**Mining Performance and Observations**

- The Raspberry Pi alone achieved a stable hash rate of about 12 to 15 H/s.

- A cooling system helped keep the board at safe temperatures during mining.

- The profitability of mining Monero varied depending on the price of the cryptocurrency.

**Pros:**

* ***Low power consumption:*** The Raspberry Pi 3B consumes only a few watts of power, making it an energy-efficient mining option.
* ***Compact and portable:*** The Raspberry Pi 3B is small and lightweight, making it easy to set up and transport.
* ***Relatively inexpensive:*** The Raspberry Pi 3B is one of the most affordable single-board computers available, making it a cost-effective mining option.
* ***Open-source software:*** The software used to mine Monero on the Raspberry Pi 3B is open-source, which means that it is free to use and modify.
* ***Large community:*** There is a large community of Raspberry Pi users and Monero miners, which means that there is plenty of support and information available online.

**Cons:**

* ***Low hash rate:*** The Raspberry Pi 3B has a low hash rate compared to dedicated mining hardware, such as ASICs or GPUs. This means that it will take longer to mine a block and earn rewards.
* ***Heat generation:*** The Raspberry Pi 3B can generate a lot of heat when mining, especially if it is overclocked. This can shorten the lifespan of the board and components.
* ***Noise:*** The Raspberry Pi 3B can be noisy when mining, especially if it is using a cooling fan. This can be a problem if you want to mine in a quiet environment.
* ***Unprofitable:*** Mining Monero with a Raspberry Pi 3B is generally not profitable, especially if the price of Monero is low. This is because the cost of electricity and the time it takes to mine a block are often higher than the value of the Monero that is earned.

**Conclusion**

- The project successfully established a Raspberry Pi 3B mining system for the Monero cryptocurrency.

- The system achieved a steady hash rate.

- The Raspberry Pi's low power consumption and small form factor make it a compact and efficient mining machine.