Task 1

* A: I think this is a far more interesting question than what was probably intended. I tend to subscribe to Warren Buffet’s maxim: “price is what you pay, value is what you get”. So given that bitcoin has no non-crime real-world use cases, the value is precisely $0. If we’re talking about the price, it doesn’t really have a set price for a couple reasons. First, each crypto exchange is its own separate market, and each market has a similar, but different price for any cryptocurrency (namely, whatever the last sale price was on that specific exchange). Though If we need to pick one, seekingalpha.com is currently showing $55,923.75. Though again, this is misleading. The overwhelming majority of bitcoin transactions are synthetic. Meaning exchanges buy and sell bitcoins to and from themselves in order to inflate trading volumes and prop up the market. This is almost exclusively done using so-called stable coins, which are simply minted out of thin air in order to facilitate these transactions and prevent the cryptocurrency market from collapsing, tether being the most popular stablecoin. So really, the price of bitcoin is probably most accurately said to be ~56,000 tether.
  + Sources:
    - <https://www.forbes.com/sites/javierpaz/2022/08/26/more-than-half-of-all-bitcoin-trades-are-fake/> (~50% synthetic transactions in 2022)
    - <https://www.wsj.com/podcasts/whats-news/most-crypto-trading-volume-may-be-fake-study-says/ac1be990-86fb-496f-bb40-4a46936681fa> (~70% synthetic transactions in 2023) (note: % has only increased as more and more tether has been printed)
    - Amount of Tether printed: <https://www.tradingview.com/symbols/USDT/>
* B: from [Forbes](https://www.forbes.com/sites/colinharper/2024/04/22/bitcoin-transaction-fees-hit-record-levels-after-halving---heres-why/): The average in March was $3.35 per coin. I wasn’t able to find a more recent source, and I don’t know if this accounts for empty blocks.
* C: If it does increase in the future, it would likely be due to halving-cycles. Each time a halving-cycles occurs, miners get half of the previous amount of bitcoin per mined block. They need to make up their costs elsewhere, and the only other lever they have available is to increase transactions fees (source: course videos).

Task 2

* A: Basically, they’re just links that get placed on a blockchain which point to some sort of digital content (typically, but not only, pictures) stored somewhere else on the web. From a technical standpoint they’re honestly not any more complicated than that. The best analogy for the overall concept of NFT’s tends to be digital Beannie Babys (source (just one among many options): <https://www.linkedin.com/pulse/nfts-beanie-babies-digital-age-brace-crash-harry-b--dzorf>).
* B: CyptoKitties is a game that combines genetics and NFTs stored on the Etherium blockchain. Each cat has a 256-bit distinct genome which represents 12 different traits, and these cats can be bred together in order to create a new cat which has a mixture of their parent’s traits along with some random variations. Trading utilizes a smart contract hosted on the Etherium blockchain. Of note: CryptoKitties previously had a valuation of over $15M, but after the NFT craze collapsed, it is now valued at less than $10K (<https://spectrum.ieee.org/cryptokitties>).

Task 3

* Namecoin is a spinoff of Bitcoin and utilizes a proof of work blockchain. Each Namecoin record contains a name and a value. For history, discussion of this started in 2010, in 2011 bitcoin and namecoin were allowed to be mined simultaneously. By 2015, only 28 of the 120,000 domain names were in use (<https://econinfosec.org/archive/weis2015/papers/WEIS_2015_kalodner.pdf>). The most interesting part of the story is in 2018 and 2019, where the OpenNIC group worked to shut down the .bit namecoin namespace due to many of the remaining domain names being used to spread malware and share child pornography (A Comprehensive Study on Namecoin). The number of deficiencies is probably endless. First, there was no market for this. DNS already existed and was both far more efficient and far more secure. Second, the main draw of the concept was that it was censorship proof, but the cryptocurrency community is almost entirely composed of bad actors. As a result, the only use cases of namecoin were in service of these bad actors (the malware and child pornography mentioned earlier). One final issue to mention was that it utilized the horribly inefficient proof of work concept.

Task 4

* To be blunt, proof of work is thought to have a problem with unacceptable energy consumption because it objectively and obviously has a problem with unacceptable energy consumption. The Bitcoin blockchain on its own, despite the overwhelming majority of Bitcoin transactions occurring off chain, consumes around 150 TWh per year (<https://ccaf.io/cbnsi/cbeci>). Compared to entire countries, this would put it at about 25th place in the world rankings, comparable to Poland, and ahead of countries such as Norway, Sweden, and Austria (<https://en.wikipedia.org/wiki/List_of_countries_by_electricity_consumption>). And it consumes this enormous amount of power to process only 7 transactions per second (<https://atomicwallet.io/academy/articles/what-is-tps>). For comparison, Visa processes around 24,000 transactions per second on average (<https://www.bitdegree.org/crypto/learn/crypto-terms/what-is-transactions-per-second-tps>). If Bitcoin wanted to be able to process the same number of transactions as Visa, it would need to consume around 20 times the entire world’s energy consumption (<https://www.statista.com/statistics/280704/world-power-consumption/>).