The stock to flow model (S2F) is used to measure the abundance of a particular resource. This model treats **Bitcoin** as being comparable to commodities such as gold, silver etc.

The stock to flow ratio is used to evaluate the current stock of a resource (total amount currently available) against the flow of new production (annually); it shows how much supply enters the market within a given period relative to the total supply.

The stock to flow model is directly related to scarcity. A resource with a higher stock to flow ratio should in theory retain its value well over the long term due to relative scarcity and low flow.

According to advocates of this model, Bitcoin is a similar resource because it is scare, relatively costly to produce (electricity and computing resource) and because its supply is capped at 21 million coins etc. All this properties makes Bitcoin a scarce digital resource and as such it should retain its value over the long term.

Although the model is useful in measuring scarcity there are several drawbacks when applied to Bitcoin and they include:

1. Over reliance on scarcity as a factor in measuring the value of a resource.
2. While a statistical relationship between stock to flow ratio and market value exist, the model doesn’t account for external factors that may affect its market value such as economic events e.g. Nations adopting Bitcoin as a means of payment .
3. The model values Bitcoin as a commodity while neglecting its other properties and varying applications.
4. The stock to flow model predicts a continuous increase in value as the stock to flow ratio increases (due to Bitcoin halving), this continuous increase would lead to a hypothetical scenario where the value of Bitcoin would be greater than or equal the world’s wealth (which is not feasible unless all wealth is held in crypto…….).
5. Bitcoin is volatile and it susceptible to sudden changes in price as it is priced in a free-market (decentralized).
6. The adoption rate which is difficult to quantify, must remain constant or increase.

B) The Black-Scholes model is used to price European options as American options could be exercised before the date of maturity.

For European Call option the Black-Scholes formula:

Where:

Co = Call price

So = Stock price = 40

X = Strike price = 45

R = risk free rate = 0.03 i.e. 3%

= volatility= 0.40 i.e. 40%

T = time to maturity = i.e. 4 months

C) The time complexity when using recursion to find fib(n) increases exponentially:

T(n) = T(n-1)+T(n-2)

T(n) = O(2n).

Also using recursion is inefficient due to repetitive computation and as fib(n), it is a poor way to use computing resources(memory).

E)