The Trust Problem – Quiz

Module 3: The Trust Problem

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Digital Finance — BSc Course

Question 1

A buyer on an online marketplace pays for a laptop but never receives it. Which concept from the lecture **best** describes why this transaction failed?

- A. The double-spend problem
- B. A missing trust mechanism between strangers
- C. A failure of the Byzantine generals protocol
- D. Inadequate cryptographic hashing

Question 1

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Answer: (B) Every transaction between strangers requires a trust assumption and a mechanism to enforce it. Without an escrow, reputation system, or other enforcement, the buyer has no guarantee the seller will deliver.

Question 2

The lecture identifies four functions that financial intermediaries perform. Which of the following is **NOT** one of them?

A. Verify (identity, solvency, ownership)
B. Match (buyer to seller, lender to borrower)
C. Innovate (develop new financial products)
D. Record (transactions, balances, history)

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- (D) Record (transactions, balances, history)

Answer: (C) The four functions are Verify, Match, Enforce, and Record. Innovation is not listed as a core intermediary function — intermediaries exist to bridge trust gaps, not to invent new products.

Question 3

Alice sends a digital file worth €100 to both Bob and Charlie at the same time. Both believe they received valid payment. What is this scenario called?

- A. The Byzantine generals problem
- B. The Nash equilibrium
- C. The double-spend problem
- D. The trust paradox

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- (A) The Byzantine generals problem
- (B) The Nash equilibrium
- (C) The double-spend problem
- (D) The trust paradox

Answer: (C) The double-spend problem is the core challenge of digital money: without a single source of truth (a ledger), the same digital coin can be sent to multiple recipients because digital files can be copied at zero cost.

Question 4

Why does physical cash **not** suffer from the double-spend problem?

A. Because central banks track every banknote digitally
B. Because physics enforces scarcity — a coin cannot be in two places at once
C. Because cash transactions are regulated by anti-fraud laws
D. Because banknotes contain watermarks that prevent copying

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Answer: (B) When you hand over a physical coin, it is gone — you no longer have it. Physics guarantees this scarcity. Digital objects lack this property: a file can be copied infinitely, so digital money needs rules (a ledger) to enforce scarcity.

Question 5

The lecture states that cross-border remittances cost 5–7% in fees. These fees are described as a "trust tax." What does the term **trust tax** mean in this context?

- A government tax on international wire transfers
- The cumulative fees extracted by intermediaries whose primary function is establishing trust between parties
- A voluntary surcharge that customers pay for premium security features
- The cost of insuring a transaction against currency fluctuation

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Answer: (B) The trust tax is the total cost of intermediaries (banks, clearing houses, correspondent banks) that exist because the sender and receiver do not trust each other directly. Each one adds a fee for providing trust.

Question 6

In the Wirecard case, the regulator BaFin filed a criminal complaint against journalists rather than investigating the company. Which trust failure does this illustrate?

- A The double-spend problem
- B Regulatory capture — the regulator protected the entity it was supposed to supervise
- C A failure of cryptographic verification
- D The Nash equilibrium in a repeated game

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Answer: (B) Regulatory capture occurs when a regulator acts in the interest of the entity it oversees rather than the public. BaFin defended Wirecard against the Financial Times' investigations, allowing €1.9 billion in fraud to continue.

Question 7

The lecture presents the trust paradox. Which statement **best** captures it?

- A. The more technology you add, the less trust you need
- B. The more you concentrate trust in a few institutions, the bigger the damage when one fails
- C. Trust is only needed for large transactions, not small ones
- D. Decentralized systems always produce more trust than centralized ones

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Answer: (B) The trust paradox is a vicious cycle: high-value transactions require more intermediaries, which creates higher cost and concentrated risk. Concentrating trust makes the system efficient but fragile.

Question 8

In a prisoner's dilemma, two suspects can either cooperate (stay silent) or defect (betray the other). If both cooperate, each gets 1 year; if both defect, each gets 5 years; if one defects and one cooperates, the defector goes free and the cooperator gets 10 years. What is the Nash equilibrium?

- A Both cooperate (1 year each)
- B Both defect (5 years each)
- C One cooperates, one defects
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Answer: (B) In the Nash equilibrium, both defect. Each player reasons: "Regardless of what the other does, I am better off defecting." The result (5 years each) is worse than mutual cooperation (1 year each), but neither can improve by changing strategy alone.

Question 9

eBay's rating system transforms a one-shot interaction between strangers into something that resembles a repeated game. Why does this make cooperation more likely?

- (A) Because eBay encrypts all transactions end-to-end
- (B) Because cheating in one transaction damages your public reputation, reducing future business
- (C) Because eBay's algorithm automatically reverses fraudulent transactions
- (D) Because buyers and sellers must pass a government identity check

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Answer: (B) Reputation systems turn one-shot games into repeated games by making past behavior visible. A seller who cheats gets negative ratings, losing future customers. This makes cooperation the dominant strategy over time.

Question 10

The Byzantine generals problem asks: how can distributed participants reach consensus when some may be traitors sending false messages? Which real-world system solves a version of this problem?

- A centralized bank database
- The Bitcoin blockchain using proof-of-work consensus
- A credit rating agency like Moody's
- An escrow service like PayPal Buyer Protection

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- (D) An escrow service like PayPal Buyer Protection

Answer: (B) Bitcoin's proof-of-work consensus solves the Byzantine generals problem by requiring miners to expend computational resources to propose blocks. Honest participants can reach agreement on a single transaction history even if some nodes are malicious.

Question 11

An online marketplace introduces an escrow service: the buyer's payment is held by the platform until the buyer confirms delivery. Which game-theory concept does this implement?

- A. Nash equilibrium
- B. Mechanism design — structuring rules so that cheating costs more than cooperating
- C. The prisoner's dilemma with simultaneous moves
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Answer: (B) Mechanism design engineers the rules of a game so that self-interested actors produce a good outcome. Escrow makes cooperation the dominant strategy: the seller only gets paid if the buyer confirms delivery, removing the incentive to cheat.

Question 12

The lecture describes a spectrum from centralized trust (banks) through hybrid trust (platforms like Airbnb) to decentralized trust (blockchain). Where on this spectrum would you place a stablecoin issued by a regulated company that holds dollar reserves?

- (A) Fully centralized — identical to a bank
- (B) Hybrid — uses blockchain technology but requires trust in the issuer's reserves
- (C) Fully decentralized — no trust in any single entity
- (D) Outside the spectrum — stablecoins are not a trust mechanism

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Answer: (B) A reserve-backed stablecoin is hybrid: it uses blockchain for transparent transfer and recording, but holders must trust that the issuing company actually holds the claimed dollar reserves. It combines elements of both centralized and decentralized trust.

Question 13

A bank charges 1.3% total fees on a domestic payment that passes through four intermediaries (the sending bank, a clearing house, a settlement system, and the receiving bank). According to the lecture, why do these intermediaries exist?

- A Because governments require four separate approvals for every payment
- B Because the buyer and seller do not trust each other directly, and each intermediary addresses a different trust gap
- C Because the technology cannot handle direct transfers
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Answer: (B) Each intermediary exists because the parties on either side do not fully trust each other. The sending bank verifies the buyer, the clearing house matches and nets transactions, the settlement system guarantees finality, and the receiving bank credits the seller. Each takes a fee for providing trust.

Question 14

The lecture argues that the 1.4 billion unbanked people worldwide are excluded not by ability or willingness, but by trust infrastructure. Which of the following **best** explains this claim?

- (A) Unbanked people lack smartphones, so they cannot access mobile banking
- (B) Each layer of trust infrastructure (ID, bank account, credit score) requires documentation from the previous layer, creating a funnel that excludes those without credentials
- (C) Banks deliberately exclude low-income customers to maximize profit
- (D) Unbanked populations do not need financial services

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Answer: (B) The trust funnel works like a ladder: no legal ID means no bank account, no bank account means no credit history, and no credit history means no access to investment. Each layer demands credentials from the layer below, systematically excluding billions.

Question 15

The lecture claims that "trust in institutions is not the same as safety." Using Wirecard as an example, which reasoning **best** supports this claim?

- A Wirecard was never actually trusted by investors
- B Wirecard was trusted (DAX-30 member, audited by EY, supervised by BaFin) yet €1.9 billion was fabricated — demonstrating that trust means exposure, not safety
- C Wirecard failed because blockchain technology was not used
- D Wirecard's investors did not perform due diligence

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Answer: (B) Wirecard had every marker of institutional trust: stock exchange listing, Big Four auditor, regulatory oversight. Yet each layer of trust assumed the one below had verified. Trust meant exposure to someone else's honesty, and that honesty was fraudulent.

Question 16

The lecture places "smart contracts" at the end of a 5,000-year evolution of trust mechanisms: barter → bookkeeping → central banks → digital payments → smart contracts. What is the key difference at each step?

- **A** Each step increases transaction speed
- **B** Each step shifts where trust resides — from personal knowledge to institutions to mathematics
- **C** Each step eliminates the need for money
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Answer: (B) Barter requires personal trust. Bookkeeping trusts the ledger. Central banks trust the institution. Digital payments trust the network. Smart contracts trust the code, which is verifiable by anyone. Each era shifts trust from people to systems, and ultimately to mathematics.

Question 17

Compare centralized trust (e.g., Visa) and decentralized trust (e.g., Bitcoin). Which trade-off does the lecture emphasize as **most important**?

- Centralized systems are slower but cheaper; decentralized systems are faster but more expensive
- Centralized systems are efficient and familiar but create single points of failure; decentralized systems eliminate that failure point but sacrifice speed and simplicity
- Decentralized systems are always superior because they remove all intermediaries
- Centralized systems are illegal in most jurisdictions; decentralized systems are the only legal option

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- (D) Centralized systems are illegal in most jurisdictions; decentralized systems are the only legal option

Answer: (B) The lecture presents trust as a spectrum, not a binary choice. Centralized systems like Visa are fast, insured, and familiar, but a single failure can be catastrophic. Decentralized systems remove the single point of failure but introduce coordination challenges and slower throughput.

Question 18

The FTX collapse (2022) and the Wirecard scandal (2020) both involved trusted entities that defrauded their stakeholders. A student argues: "These failures prove we should replace all centralized intermediaries with decentralized systems." Which response **best** evaluates this argument?

A. The student is correct — all intermediaries should be replaced by blockchain

B. The argument is too broad: decentralized systems also have risks (smart contract bugs, governance attacks), and many intermediary functions (identity verification, dispute resolution) are difficult to decentralize

C. The argument is wrong because centralized systems never fail

D. The argument is irrelevant because decentralized systems are illegal

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Answer: (B) While Wirecard and FTX exposed real failures of centralized trust, decentralized systems introduce their own risks. Not all intermediary functions can be replaced by code — verification and dispute resolution often require human judgment. The future is finding the right point on the trust spectrum for each use case.

Question 19

A fintech startup claims it has built a "fully trustless" payment system. Based on the lecture's framework, which question would **best** test this claim?

A. "How many transactions per second can it handle?"

B. "Where does the trust chain terminate — in a human authority, in code, or in cryptographic proof — and what happens if that layer fails?"

C. "Does it comply with banking regulations?"

D. "How many users does it have?"

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(D) "How many users does it have?"

Answer: (B) The lecture shows that every trust mechanism ends somewhere. "Trustless" systems still require trust in the code, the protocol design, the consensus mechanism, or the developers. The critical question is where the chain ends and what the failure mode looks like.

Question 20

The lecture argues that "the highest-value sectors (real estate, cross-border trade, capital markets) are the most ripe for trustless disruption." Using the trust paradox as your framework, explain why this is the case. Which answer is **most complete**?

A. Because these sectors have the lowest transaction volumes

B. Because high-value transactions require more intermediaries, which increases costs and concentrates risk — making the savings from removing intermediaries largest

C. Because these sectors already use blockchain technology

D. Because regulators are most lenient in these sectors

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Answer: (B) The trust paradox creates a vicious cycle: high-value transactions demand more verification, more intermediaries, and higher fees (5–10% for real estate, 3–7% for cross-border payments). The more trust infrastructure is required, the greater the potential savings from replacing it with trustless alternatives.