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### **Лучше, чем золото**

Мы привыкли к тому, что мировые валюты принадлежат государствам и контролируются ими, но с развитием информационных технологий и криптографии появилась альтернатива, никому не принадлежащая и имеющая специфический «золотой резерв» – криптовалюта.

### **Better than gold**

The idea behind digital cryptographic currencies is not that easy to understand. Real money is always backed up with gold reserves to prevent inflation and to prove its value, and though you can't really hand over a dollar at the bank and then get some gold back, this is how it works. What can digital currency theoretically use as a gold reserve? Well, there goes the unusual thing – mathematics.

Crypto-currencies use cryptographic hash functions as a proof-of-work and to produce new money. Usually process of producing is a resource intensive computation with aim to find strings with hash of a certain structure. This is called 'mining'. Any person with enough

machine power can do this. This is the first advantage of digital money – decentralization. Emission of money comes in form of rewards for successful generation of hashes, and no single player can control it, not even corporation size of Google.

Another feature of money is that at a given time one person can be an owner of a coin. In crypto-currencies you usually send a transaction for each operation into the net. Mining users get information about this transaction and add it to the block of transactions. Whenever new hash is mined, all resent transactions are packed in and sent over the net with the hash to notify other users that the new block was generated [1].

First crypto-currency to be created is Bitcoin. It is peer-to-peer payment network, which means that transaction is proceeded by a pair of users stand-alone, and it is powered by its users with no central authority or middlemen [2]. ‘Crypto-currency’ concept was first described in 1998 by Wei Dai on the cypherpunks mailing list, suggesting the idea of a new form of money that uses cryptography to control its creation and transactions, rather than a central authority. The first Bitcoin specification and proof of concept was published in 2009 in a cryptography mailing list by Satoshi Nakamoto. Satoshi left the project in late 2010 without revealing much about himself. The community has grown exponentially with many developers working on Bitcoin.

Nobody owns the Bitcoin network much like no one owns the technology behind email. Bitcoin is controlled by all Bitcoin users around the world. While developers are improving the software, they can't force a change in the Bitcoin protocol because all users are free to choose what software and version they use. In order to stay compatible with each other, all users need to use software complying with the same rules. Bitcoin can only work correctly with a complete consensus among all users. Therefore, all users and developers have a strong incentive to protect this consensus [3].

From a common user’s perspective, Bitcoin is nothing more than a mobile app or computer program that provides a personal Bitcoin wallet and allows a user to send and receive bitcoins with them.

Behind the scenes, the Bitcoin network uses transaction blocks. In whole, they contain every transaction ever processed, allowing a user's computer to verify the validity of each transaction by checking block chains. Block chains, as we said, prevent double-spending, as well as grant security. The authenticity of each transaction is protected by digital signatures corresponding to the sending addresses, allowing all users to have full control over sending bitcoins from their own Bitcoin addresses [4].

Bitcoin uses public-key security to protect user's wallets. This is the part where currency is crypto – two-key privacy is granted by usage of SHA 256 algorithm. The point is that you use your public key as an account for payments and your private key to access your Bitcoins. Cracking of private key takes whole lot of time, and to get full access hackers need your transaction log to get a hold of an account, so, it is quite secure system [2].

Other crypto-currencies mostly copy Bitcoin system, using different formulae for hash but same principles. Those crypto-currencies are Litecoin, Peercoin, Namecoin and others. There is also a crypto-currency protocol which is not a rip off of the Bitcoin, called Ripple. Unlike Bitcoin, all account balances in the Ripple system are public, so anyone can check their validity, and instead of block chains system comes to “consensus” every 2–5 seconds, which means that all transactions at a given period are legal and proceed.

Since 2009, Bitcoin system evolved greatly, increasing medium cost of 1 BTC from some cents to 700 dollars or so. Bitcoins are accepted widely, not only in internet shopping, but in real life. Growing demand results in unstable cost of Bitcoins. People who bought or mined BTC in early 2010–2011 literally won a jackpot, getting hundreds of % of income.

It may seem that mining, even if reward is halved to 25 BTC, now totally pays off, but it does not. Many people compare it to California Gold Rush, because people who provide tools for mining earn much more. There are professional mining stations throughout the world, which use specially designed chips for BTC mining. In some countries it is a good way to invest, for example, in China, because yuan is not convertible and is under government’s control, but mainly people do it just to support the system. From a programmer’s perspective, Bitcoin is like money with API. In regular currencies there is also something we can call an API, but there is no access to it for common user as a security measure. But as for crypto-currencies, you can do whatever you feel to with your money, even cross some of natural limitations of the system, such as irreversibility of transactions, with a bit of programming.

There are 3 different types of API for Bitcoin. First one is a script language similar to Forth, which is used to describe transactions. The second one is used for peer-to-peer connections, allowing nodes communication. The third one is a low-level client API, which provides services for account management and etc. Official Bitcoin client is called Bitcoind, and it is quite optimal, but there are a lot of custom clients with

different functionality, and even custom API's, such as Stratum API – service for distributed computation in mining [3].

For now, Bitcoin is drawing enormous amount of media and user attention. It is far from being perfect, and in some way may become dangerous for world economics, but sure is an interesting alternative for paper money.

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### **Социальное партнерство в профессиональном образовании как лекарство от молодежной безработицы**

Статья посвящена проблеме безработицы среди молодого населения и возможным способам ее решения, среди которых – социальное партнерство в профессиональном образовании. Авторы рассматривают понятие, цель и формы социального партнерства в профессиональном образовании. Особое внимание уделяется преимуществам данного партнерства. Определены предпосылки взаимодействия социальных партнеров, выявлены основные угрозы для развития социального партнерства в сфере профессионального образования.