University of Wyoming, Blockchain 4010 and 5010

Class at UW (University of Wyoming) for blockchain.

Class 4010 and 5010.

Time: 12:00 (noon) till 12:50 PM, Monday, Wednesday, Friday.

Office Hours:

Tuesday 12:00 to 1:30 PM

Thursday 5:00 to 6:30 PM

Lecture 01 - Aug 29, 2018

Overview

Lecture 01 - Aug 29 - Wednesday - Class Overview

1. Class Overview
    1. What is Blockchain / Bitcoin - why it is important.

        In 2009, a person or group of people named Satoshi Nakamoto published “Bitcoin: A Peer-to-Peer Electronic Cash System”. … The Bitcoin design was revolutionary—it elegantly tied cryptography, game theory, and economics into a trustless solution to the double-spend problem, and introduced the world to the first “chain of blocks”, a censorship-resistant public ledger protected by proof-of-work.

        This is a big deal. Unlike traditional payments, Bitcoin transactions don’t rely on a trusted third-party. Anyone can connect to the network and transact, without fear of censorship. Satoshi’s work solved these problems, and founded the field of cryptoeconomics.

        In 2013, Vitalik Buterin proposed a new cryptocurrency—Ethereum. Ethereum was Vitalik’s answer to Bitcoin’s poor scripting capabilities. Instead of focusing on financial transactions and their outputs, Ethereum transactions are about state: agreeing on a computed state, and transitioning from one state to the next.

   Each transaction in Ethereum includes a sender, recipient, funds, and data, similar enough to Bitcoin. Unlike Bitcoin, however, a recipient can be a user or a smart contract.

2. Gartner group projects that 3% of the world economy will blockchain based in 10 years. This is a compounded annual growth rate of 62.2%.

3. Plan - do lectures in advance of when assignments are due on the material - give students time to do homework. Mark what is going to be tested on.

4. This class is not a “heavy” programming class. Yes you will program - but not a huge amount. Unlike a lot of computer science classes this class has a paper and will have test questions involving definitions. We are going to cover some finance, accounting, economics and other topics - not just “how to build a better program”. If you have a limited programming background I will work with you.

2. What this class will cover

   1. What is Blockchain - what is Bitcoin / Ethereum / Other token systems
   2. The worlds worst, most expensive database
   3. What is the “hype” - what is real about blockchain.
   4. Economics - Coin, ICO, Stocks, Bonds, Tokens, Utility Tokens, A Security
   5. Legal Ramifications. ICOs 506(d), Subpart (s)
   6. Programming - $^1/_2$ in go, $^1/_2$ in Solidity (Ethereum) and Web front end (JavaScript/HTML/CSS).
   7. Some Homework
   8. Write a Paper - How will blockchain effect the economy.
   9. 2 tests (Midterm and Final)
   10. Why Go
   11. What is Proof of work
   12. What is Proof of stake
   13. Enough Go to make it through this class (and be able to convincingly tell an employer that you have programmed in Go)
   14. Why Ethereum? Solidity?
   15. dApp - what is that? What is web3?
   16. A detailed understanding of the security model behind Blockchain
   17. Some advanced stuff on security - distributed computation and public/private keys, distributed key generation.
   18. What is a “tangle” - why is a blockchain called a “chain”.

19. Why is blockchain so slow?
20. How to explain “blockchain” to people - the 30 second elevator pitch.
21. How to develop for a blockchain.

3. A little bit of background on the instructor

    1. pschlump@uwyo.edu (or pschlump@gmail.com)
    2. https://github.com/Univ-Wyo-Education/Blockchain-4010-Fall-2018
    3. (for emergencies between 7:30AM and 9:00PM) 720-209-7888 (cell)
    4. This is a “practical” class.
    5. Class Goal - have every student in this class be able to work effectively in the Blockchain/Ethereum world. There are students in this class that are from other departments. The class has been structured to take this into account.
    6. Where the students are and the opportunity they have today.
    7. Realizing Your Dreams.

4. Class policy - UW requires that I talk about cheating. stackoverflow.com and Google are your fiends in this class - give credit where credit is due. Warning: stackoverflow.com on ethereum/solidity is badly out of date becuse the technology is changing really fast. If you copy from the web - I expect a comment and a link (URL) to the source of where you got your copy. I expect an explanation of what and why you are grabbing someting from the web. I expect an analysis of what license the content is under, MIT, GPL2, GPL3, CC, CC-BY etc.

5. Late Policy and (3) Late Coupons I have a grader - most of the grading will be automated. You get 3 late coupons - I will send them to you in email. You can use them for handing in homework 1 week after the due date. Late coupons will be tracked on a semi-private Ethereum Blockchian with a Smart Contract. Your tokens, pin, password will be given to you in a week or so.

   Application: http://www.2c-why.com/UW-4010-dApp/ (Available Sep. 10)

6. 70% from homework, 40% from tests. Midterm and Final. There will be 2 projects for the class. You will have to give a live, in person, demo to the instructor of both of your projects and you **must** get them to work. They are required to pass the class.

7. Class Points Total

   Points available:

Points	Class Item

Points	Class Item
1400	Homework total
800	2 tests

To get a letter grade in the class:

Points	Semester Grade
1800 or above	A
1600 ... 1799	B
1400 ... 1599	C
1200 ... 1399	D

You **must** demonstrate working projects to the instructor to pass the class (no matter how many points you get). The 2 projects in the class will be directly from the homework. Project one is Homework Assignments 02 to 06. Project 2 is Homework Assignments 08 to 11. Homework will be 100 or 200 points each. Midterm will be 400 points. Final will be 400 points and cumulative. You can expect programming and writen assignments in this class.

For anybody that just wants to take on a hard project for extra credit see the instructor. It is hard. So think a letter grade for completion of an extra credit project. Code for extra credit projects will be open source under a MIT license. Also note that there are 2200 points available on a letter grading scale of 2000 points. You have a built-in 200 point extra credit in the homework and tests.

8. textbook: An Introduction to Programming in Go, pdf for free There are no good books on Ethereum/Soliddity. Solidity has moved from version 4.12 to 4.27 this year. All of the books are out of date. So.... I will include links in assignments that you are expected to read.

9. De-Hype Blockchain What is a - blockchain: a decentralized, consensus driven store with identities and economic incentives. - stake: (as in Proof-of-Stake) (not steak!) an on-chain identity that holds at least the minimum amount of value required to be a participant in the network.

    1. Successes
        - Show Some current screen caputre images.
        - Forcast of blockchain growth.
    2. Failures
        - Over $^1/_2$ of ICOs are proably fraud
        - Slowest most expensive and inconvinent database in existence.

Lecture 02 - Aug 31 - Friday

1. Economics of Blockchain and Computer Technology - why this is important
    1. How important is blockchain to the economy.
    2. A $40 billion dollar example. 40% decrease in shipping time
    3. Accounting / Banking
    4. Supply Chain
2. Overview of blockchain, bitcoin, EOS, ripple, lightning and Ethereum
3. Good and bad about Go
4. Go

References

Go

Sep 3 - Labor Day - Day Off

Future lectures will be added....

Yep - schedule is not set in stone yet.

Assignments and Due Dates

This is a tentative schedule (Subject to change by the instructor):

Assignment	Due Date	Points
AS-01 Learn Go	Sep 12	100
AS-02 Mining Blocks	Sep 19	100
AS-03 Merkle Trees	Sep 26	200
AS-04 Transactions	Oct 3	100
AS-05 Wallets	Oct 10	100
AS-06 Smart Contract	Oct 17	100
Paper Due	Oct 26	100
Midterm and Demo Proj 1.	Week of Oct 29	400
AS-07 Solidity & Truffle	Nov 7	100
AS-08 dApp calls Contract	Nov 14	100
AS-09 Grades Contract	Nov 21	100

Assignment	Due Date	Points
AS-10 Web Front End (pt1)	Nov 28	100
AS-11 Web Front End (pt2)	Dec 7	200
Demo Proj. 2 start Dec 5		
ends Dec 14		
Final		400

Textbook

An Introduction to Programming in Go The link is to the free PDF of the text. The book is out of print.