

## **Distributed “Tic Tac Toe”: Playing with the Blockchain consensus**

In this 2-day course we will design the flow of a Blockchain powered “Tic Tac Toe” game where, regulated by the Blockchain Consensus System, users can play one against the other, one Blockchain transaction at a time. While having fun, you will gain an understanding that Blockchain is more than a “distributed ledger”; you will also learn about the difference between a “Smart Contract” and a “Smart Transaction,” how the Blockchain Consensus works, and what it can be used for. After this course, each participant should have acquired the conceptual notions to design systems that are able to solve any decentralised and distributed process using Blockchain as a parameterised communication channel between parties.

### **Objective**

#### **A. Knowledge and Understanding (Theory Component)**

At the end of this course, participants should be able to:

- Describe the basics of Blockchain Systems (P2P, Cryptography, and Data Management)
- Explain the key concepts of Blockchain Consensus System:
  - Flow of a Blockchain transaction
  - Mechanics of the consensus system
  - The need for “proof of something” to validate blocks
  - The difference between a “Smart Contract” and a “Smart Transaction”
- Discuss why there are Public, Private, Permissionless, and Permissioned Blockchains

#### **B. Key Skills (Practical Component)**

At the end of this course, participants should be able to:

- Design Blockchain Consensus Logics to provide solutions of any kind
- Outline the structure, logic, and flows of a Blockchain
- Identify the right type of Blockchain protocol based on the solution to implement

## Topics

Time	Agenda
<b>Day 1</b>	
09:00 – 09:15	2-Day Course Overview
09:15 – 10:45	The 4 elements of a Blockchain: <ul style="list-style-type: none"> <li>• Peer-to-Peer network</li> <li>• Cryptography</li> <li>• Data Management</li> <li>• The Consensus System</li> </ul>
10:45 – 11:00	Break
11:00 – 12:30	How Blockchain blocks are created, PoW, PoS, and Po?
12:30 – 14:00	Lunch
14:00 – 15:00	The flow of a transaction in a Blockchain System
15:00 – 16:00	The “Tic Tac Toe” game requirements <ul style="list-style-type: none"> <li>• Database structure</li> <li>• Basic rules of the game</li> <li>• Basic application logic</li> </ul>
16:00 – 17:00	Designing custom Blockchain transactions and consensus system for the “Tic Tac Toe” game
17:00 – 17:30	Assessment
<b>Day 2</b>	
09:00 – 10:00	The difference in implementing the game of “Tic Tac Toe” as a “Smart Contract” compared to a “Smart Transaction” system.
09:15 – 10:45	An overview of Nxt: a decentralised applications platform
10:45 – 11:00	Break
11:00 – 12:00	An overview of Tendermint: Byzantine fault-tolerant replicated state machines
12:00 – 13:30	Lunch
13:30 – 17:00	Class Exercise: <ul style="list-style-type: none"> <li>• Design the logic flow and consensus rules for a driving test system using Blockchain</li> </ul>
17:00 – 17:30	Assessment

## Requirements

- Attendees should have at least a basic understanding of Blockchain
- Attendees have to bring along their own laptop
- Optional: have a copy of Nxt installed in your computer  
(download from: <https://nxtforum.org/nrs-releases/nrs-v1-11-5/> )

**Duration: 2 days**

**Venue: Singapore University of Social Sciences** (formerly known as SIM University)

**Minimum number to run: 25 participants**

**Certificate of participation is awarded upon 75% attendance for the course**

**(As the university was renamed recently on 17 March 2017, we will be reprinting our course certificates to incorporate the new name and logo. As such, you will receive your certificate at a later date.)**

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## Trainer's Profile



Roberto Capodieci discovered a passion for Information Technology at the tender age of 6 when, with the help of his father, he started to learn computer programming. By age 10 he had developed and sold his first video game. Four years later he began an entrepreneurship career, and, authorised by Italy's court for minors, set up his first IT company. In the formative years of the Internet he expanded his business reach into the online world and quickly found his company's services to be in great demand. Roberto, who specialises in Lawful Interception systems and big data analysis, is also a consultant to law enforcement agencies. After having moved to Asia a decade ago, Roberto is now a renown Blockchain expert, associate of the Nxt Foundation, CTO of Digital Billions, and CEO

of OTDocs, the Singaporean company behind the innovative Open Trade Documents Blockchain project. Roberto often speaks at conferences, participates in technology discussion panels at various events, and gives seminars on Blockchain technology.

## Course Fee

Categories	Duration (days/hours)	Full Course Fee without gst (A)	GST based on full fee (B)	SSG funding* without gst (C)	Course fee after funding* without gst) (D)	Course payable and GST (D+B)
<b>Singapore Citizens</b>	All aged 35 and above and earning \$1900 or less per month <sup>1</sup>	\$1100	\$77.00	\$1045.00	\$55.00	<b>\$132.00</b>
	Participants aged 40 and above <sup>2</sup>			\$650.00	\$450.00	<b>\$527.00</b>
	Participants aged from 21 to 39			\$195.00	\$905.00	<b>\$982.00</b>
<b>PRs*</b>				\$195.00	\$905.00	<b>\$982.00</b>
<b>Others</b>				-	-	<b>\$1,177.00</b>

The listed course fees are inclusive of GST.

\* Course fee after SSG funding

<sup>1</sup> Under the Workfare Training Support (WTS) scheme. For more information on the scheme, click [here](#).

<sup>2</sup> Under the SkillsFuture Mid-career Enhanced Subsidy. For more information, visit the [SkillsFuture website](#).

### Funding Incentives - Course Fee Subsidies

#### Eligibility Criteria:

1. Singaporean or Permanent Resident (PR) aged 21 years old and above
2. Participants must:
  - achieve at least 75% attendance
  - complete and pass all required assessments

**Note: Participants who have been granted the SSG funding but fail to meet the above requirements will have to pay for the subsidised course fee.**