

# **CSH1F2 Introduction to Computer Science**

## **Session 1: Introduction**

Author: Lecturer Team

Bachelor of Engineering, School of Computing



## Grades

- ▶ Based on academic rules
  - $A > 80$
  - $70 < AB \leq 80$
  - $65 < B \leq 70$
  - $60 < BC < 65$
  - $50 < C \leq 60$
  - $40 < D \leq 50$
  - $E \leq 40$  or **because of academic dishonest activity by student**
- ▶ Grade composition
  - Class projects : 10 to 20% each project, around 5x projects
  - UTS / mid exam : 0%
  - UAS / final exam : 0%
  - Tugas Besar / final project : 0%
  - Attendance : 0%
- ▶ Notes
  - Min 75% attendance is required to get B grade

# Academic Dishonest

## ► **Penyontekan (*Cheating*)**

includes the act of actually receiving and giving assistance beyond the authority or giving and receiving illegal benefits in all forms of academic work.

## ► **Plagiat (*Plagiarism*)**

includes stealing or copying sentences, structures, ideas and / or thoughts of others and imitating the work / work of others, or such business ventures, without mentioning the copied sources or references.

## ► **Pemalsuan (*Falsification*)**

includes statements or words or writing that is not true or false documents against any conditions related to one's academic history. Counterfeit actions include - but are not limited to - signature falsification, altering or damaging official data, providing false documents or adding or reducing or deleting information on academic documents, or changing test answer statements or other academic work after the test period or time limit specified.

# Targeted Competence

- Able and understand the introductory concepts related to:
  - Digital Information and Internet,
  - Algorithm and Data Structures,
  - Data Representation and Manipulation,
  - User Interface and User Experience
  - Big Data and Data Analytics,
  - Modern Software Development Approach
- Understand fast trajectory of information technology in current disruption in innovation
- Able to relate topics in this lecture with other courses and specializations in School of Computing Telkom University

# Reference

- › <https://www.code.org> or <https://scratch.mit.edu> (for class projects)
- › <https://git-scm.com> and <https://www.github.com> (for class projects)
- › <https://edx.org> (course: Harvard CS50 – Problem Set 0)
- › <https://coursera.org> (course: UCSD Algorithmic Toolbox – Week 1, Week 2)
- › <https://cognitiveclass.ai> (course: Data Visualization with Python – Module 1, Module 2)
- › <https://www.mckinsey.com> (topic: Digital, Internet of Things, Analytics)
- › <https://www.gartner.com/> (topic: Magic Quadrant, Hype Cycle)
- › Other resources to support weekly lecture materials.
- › Subject to be changed based on class schedule and student progress.

# Our Class Rules

- 1. Be prepared for each session and don't be late more than 20 minutes
- 2. Turn off or silent all communication device
- 3. Attend by system (student-card tapping) and bring your own laptop
- 4. Provide class contact person to lecturer
- 5. Start Whatsapp or Line group during the lecture
- 6. This class syllabus is different compared to other parallel classes, we are achieving the same learning goals though. You are free to invite others to this class to learn together
- 7. No homework, no UTS, no UAS, we try to maximize class discussion and interactivity
- 8. We learn together

# Syllabus and Class Schedule

1. Introduction and Internet
2. Algorithms - class project
3. Algorithms - class project (\*)
4. Data Structure
5. Data Structure – class project (\*)
6. Data Representation
7. Data Representation – class project (\*)
8. UI and UX
9. UI and UX – class project (\*)
10. Big Data and analytics
11. Big data and analytics – class project
12. Modern software development framework
13. Modern software development framework – team project (\*)
14. Modern software development framework – team project (\*)

(\*) = classroom tap only, then free to learn anywhere = 6 sessions

# Final Project

- ▶ No Tugas Besar or Final Project for this class.



# Who: Anton Herutomo

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- Linkedin <https://www.linkedin.com/in/antonherutomo> (content not updated for privacy reason)

## Experience :

- Founder and Advisor - **Cahaya Quran** (Islamic content publisher in Jawa Pos Group Indonesia) since 2017
- Founder and Advisor - **Quran Cordoba** (Islamic content publisher in Indonesia and Malaysia) since 2013
- Project Director Sharia Fintech - **PT Telkom Metra** (fintech startup under Telkom Indonesia) since 2017
- CTO - **PT Reta Consulting Indonesia** (a Singapore based startup in retail audit) since 2017
- Founder - **Websekolah.org** (an Indonesian startup in education with Gramedia Group) since
- Treasurer - **Yayasan Darussalam** (Islamic foundation in Bandung Barat, Indonesia) since 2011
- Professional Lecture - **Telkom University** (School of Computing) since 2010
- Previous:
  - **PT Telekomunikasi Indonesia Tbk**, 1998-2006, Manager level
  - **PT XL Axiata Tbk**, 2006-2010, GM level
  - **PT Witami Tunai Mandiri (Truemoney)**, 2016-2017, Chief Technology Officer

## Education :

- 1992 – 1996 Teknik Informatika, Telkom University
- 1996 – 1998 School of Computer Systems Engineering, RMIT University

# Introduction

## 1. Why Computer Science?

## In 2 minutes

- ▶ Write in a paper: 5 words that you think really represent the Computer Science
- ▶ Put it carefully (I'll ask again later)

# Why Computer Science?

- ▶ Computer Science is change everything

- ▶ 19<sup>th</sup> century?



- Is marked by the industrial revolution

- ▶ 20<sup>th</sup> century?



- Is marked by physics and engineering

# Why Computer Science?

## ► 21<sup>st</sup> century?



- Digital age/ internet
- Examples:
  - agriculture,
  - fashion,
  - medical,
  - energy,
  - weather,
  - Art and entertainment

# Introduction

1. Why Computer Science?
2. Is it hard to learn programming?

# Is it hard to learn programming?

- ▶ Do you wanna be a *programmer*?



- ▶ *Programming* is ... ?



- Tell the computer what we want it to do
  - Teach computer to do something
  - Creating something from scratch, as we want
  - Need time to do
  - Sometimes intimidating, but it can be learned
  - Breaking down the problems
- ▶ IT engineer is needed by many fields

# Is it hard to learn programming?

## ▶ How do you start?



- Jack (Twitter): obsessed by the map and its information
- Bill (Microsoft): software to decide classmate (girl)
- Drew (Dropbox): software asking favourite colour and age
- Elena (Clothia.com): drawing circle and square on the screen
- Gabe (Valve) : program 'hello world'

## ▶ What next?



- Need imagination, team work, and supportive work environment



# Is it hard to learn programming??

- ▶ What's the benefit and for whom? How?
  - Make a group of 3, see following video and make a summary of it



- After you watching the video, write again 5 words that most representing the computer science

## 5 words represent computer science?

▶ <Before introduction>

▶ 1.

▶ 2.

▶ 3

▶ 4

▶ 5

▶ <After introduction>

▶ 1.

▶ 2

▶ 3

▶ 4

▶ 5

# Internet Intro

## 1. Numeric transmission

# Numeric Transmission

- ▶ While the binary number system can be used to represent any value we wish,
- ▶ in practice the range of values we are able to represent is limited by the number of bits we use.
- ▶ Thus, protocols for exchanging binary information must specify in advance how many bits will form a single number among other things.
- ▶ Without knowing this information the receivers of a message have no way of determining how to break up an incoming stream of bits into individual numbers; it will just appear to be a random string of 0s and 1s.

# Internet Intro

1. Numeric Transmission
2. Text Coding and Transmission

# Text Coding and Transmission

- ▶ ASCII - ASCII - American Standard Code for Information Interchange. ASCII is the universally recognized raw text format that any computer can understand.
- ▶ code - (v) to write code, or to write instructions for a computer.

# ASCII

- ▶ ASCII codes were originally 7 bits long and so there are 128 possible values.
- ▶ 0-31 are “control characters” that are largely defunct and go unused; they were formerly used to control various aspects of machines and printers.
- ▶ 32-126 are printable characters and include the numbers 0-9, all 26 letters (both lowercase and uppercase), and many common punctuation symbols.
- ▶ 127 is the symbol for delete.
- ▶ Over time, 8 bits became a standard “chunk-size” for encoding information. ASCII made the transition to this 8-bit encoding by just adding an extra 0 to the front of the old 7-bit codes.

# Activity 1 (in 5 mins)

► **Quick Activity: write your name in ASCII codes**

	_0	_1	_2	_3	_4	_5	_6	_7	_8	_9	_A	_B	_C	_D	_E	_F
0_	NUL 0000 0	SOH 0001 1	STX 0002 2	ETX 0003 3	EOT 0004 4	ENQ 0005 5	ACK 0006 6	BEL 0007 7	BS 0008 8	HT 0009 9	LF 000A 10	VT 000B 11	FF 000C 12	CR 000D 13	SO 000E 14	SI 000F 15
1_	DLE 0010 16	DC1 0011 17	DC2 0012 18	DC3 0013 19	DC4 0014 20	NAK 0015 21	SYN 0016 22	ETB 0017 23	CAN 0018 24	EM 0019 25	SUB 001A 26	ESC 001B 27	FS 001C 28	GS 001D 29	RS 001E 30	US 001F 31
2_	SP 0020 32	! 0021 33	" 0022 34	# 0023 35	\$ 0024 36	% 0025 37	& 0026 38	' 0027 39	( 0028 40	) 0029 41	* 002A 42	+ 002B 43	, 002C 44	- 002D 45	. 002E 46	/ 002F 47
3_	0 0030 48	1 0031 49	2 0032 50	3 0033 51	4 0034 52	5 0035 53	6 0036 54	7 0037 55	8 0038 56	9 0039 57	: 003A 58	; 003B 59	< 003C 60	= 003D 61	> 003E 62	? 003F 63
4_	@ 0040 64	A 0041 65	B 0042 66	C 0043 67	D 0044 68	E 0045 69	F 0046 70	G 0047 71	H 0048 72	I 0049 73	J 004A 74	K 004B 75	L 004C 76	M 004D 77	N 004E 78	O 004F 79
5_	P 0050 80	Q 0051 81	R 0052 82	S 0053 83	T 0054 84	U 0055 85	V 0056 86	W 0057 87	X 0058 88	Y 0059 89	Z 005A 90	[ 005B 91	\ 005C 92	] 005D 93	^ 005E 94	_ 005F 95
6_	` 0060 96	a 0061 97	b 0062 98	c 0063 99	d 0064 100	e 0065 101	f 0066 102	g 0067 103	h 0068 104	i 0069 105	j 006A 106	k 006B 107	l 006C 108	m 006D 109	n 006E 110	o 006F 111
7_	p 0070 112	q 0071 113	r 0072 114	s 0073 115	t 0074 116	u 0075 117	v 0076 118	w 0077 119	x 0078 120	y 0079 121	z 007A 122	{ 007B 123	 007C 124	}	~ 007E 126	DEL 007F 127



# Intro to Internet

1. Numeric Transmission
2. Text Coding and Transmission
3. Internet for All

# Internet

- ▶ IETF - Internet Engineering Task Force - develops and promotes voluntary Internet standards and protocols, in particular the standards that comprise the Internet protocol suite (TCP/IP).
- ▶ Internet - A group of computers and servers that are connected to each other.
- ▶ Net Neutrality - the principle that all Internet traffic should be treated equally by Internet Service Providers.

# What is Internet ?

- ▶ Video 1
- ▶ Tahun 1970-an, Vint and Bob Kahn designed it
- ▶ It was an advancement of ARPANET (Advance Research Project Agency Network) by Department of Defense, USA
- ▶ It started with experimental message exchange network which turned out to be nationwide scale

# Who controls Internet?

- ▶ Video 2
- ▶ nobody and everybody is in charge of making the internet work but the reason it all works together because everyone uses the same protocols.
- ▶ who develops these protocols? Who makes the final decisions? Who is in charge? The amazing thing is that no single person, government, or corporation is in charge.
- ▶ Rather, it is a collection of citizens and volunteers interested in defining the standards who formed a volunteer organization called the Internet Engineering Task Force to develop and promote voluntary internet standards IETF.

## Vocabulary [1]

- ▶ IP Address - A number assigned to any item that is connected to the Internet.
- ▶ Packets - Small chunks of information that have been carefully formed from larger chunks of information.
- ▶ Protocol - A set of rules governing the exchange or transmission of data between devices.
- ▶ Video 3

# Internet

- ▶ Many network systems, such as local ethernet and WiFi, rely on addressing schemes
- ▶ to make sure bits are received by the correct computer based on address and
- ▶ for other computers to simply ignore messages not intended for them.

## Vocabulary [2]

- ▶ Packets - Small chunks of information that have been carefully formed from larger chunks of information.
- ▶ TCP - Transmission Control Protocol - provides reliable, ordered, and error-checked delivery of a stream of packets on the internet. TCP is tightly linked with IP and usually seen as TCP/IP in writing.

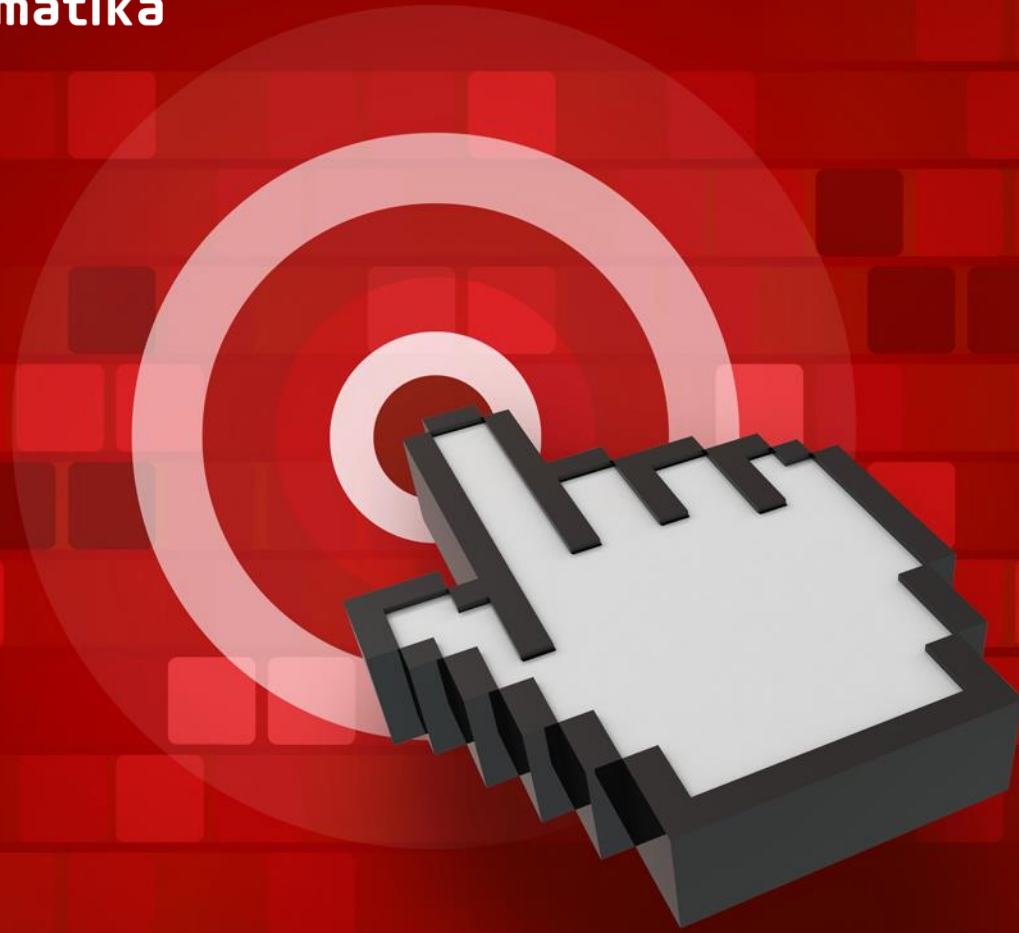
# Worksheet

1. Prepare for next week (Session 2) by installing Git through <https://git-scm.com>, in this lecture we use Windows as our default operating system.
2. Learn how to use Git in 20 minutes at
  - [https://www.youtube.com/watch?v=Y9XZQO1n\\_7c](https://www.youtube.com/watch?v=Y9XZQO1n_7c)
  - [https://www.youtube.com/watch?v=SWYqp7iY\\_Tc](https://www.youtube.com/watch?v=SWYqp7iY_Tc)
3. Open a Github account at <https://www.github.com> and share the account to Lecturer for subsequent class collaboration
4. Bring a laptop for next session (one student one laptop)





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*THANK YOU*