

A photograph of two young women in a room. The woman in the foreground is a young Asian woman with short blonde hair, wearing a dark blue sweater with white stripes on the sleeves, smiling and looking towards the right. Behind her is a young Black woman with dark curly hair, also smiling. The background wall is white and covered with several small, rectangular photographs. A red date stamp '02/2020' is overlaid on the top right of the image.

02/2020

# SNAKE GAME PROJECT

At IU, June 08<sup>th</sup> 2020, Semester 2 (2019 – 2020)

**Author: Group 01**



Leader: PHAM HOANG MINH  
ID: ITITIU19031 (30%)

A close-up photograph of a person's hand pointing their index finger at a smartphone screen. The person is wearing a white button-down shirt. The background is out of focus, showing more of the shirt and a cup of coffee.

# About Us



Member: HA MINH KHOA  
ID: ITITIU19020 (70% / 3)

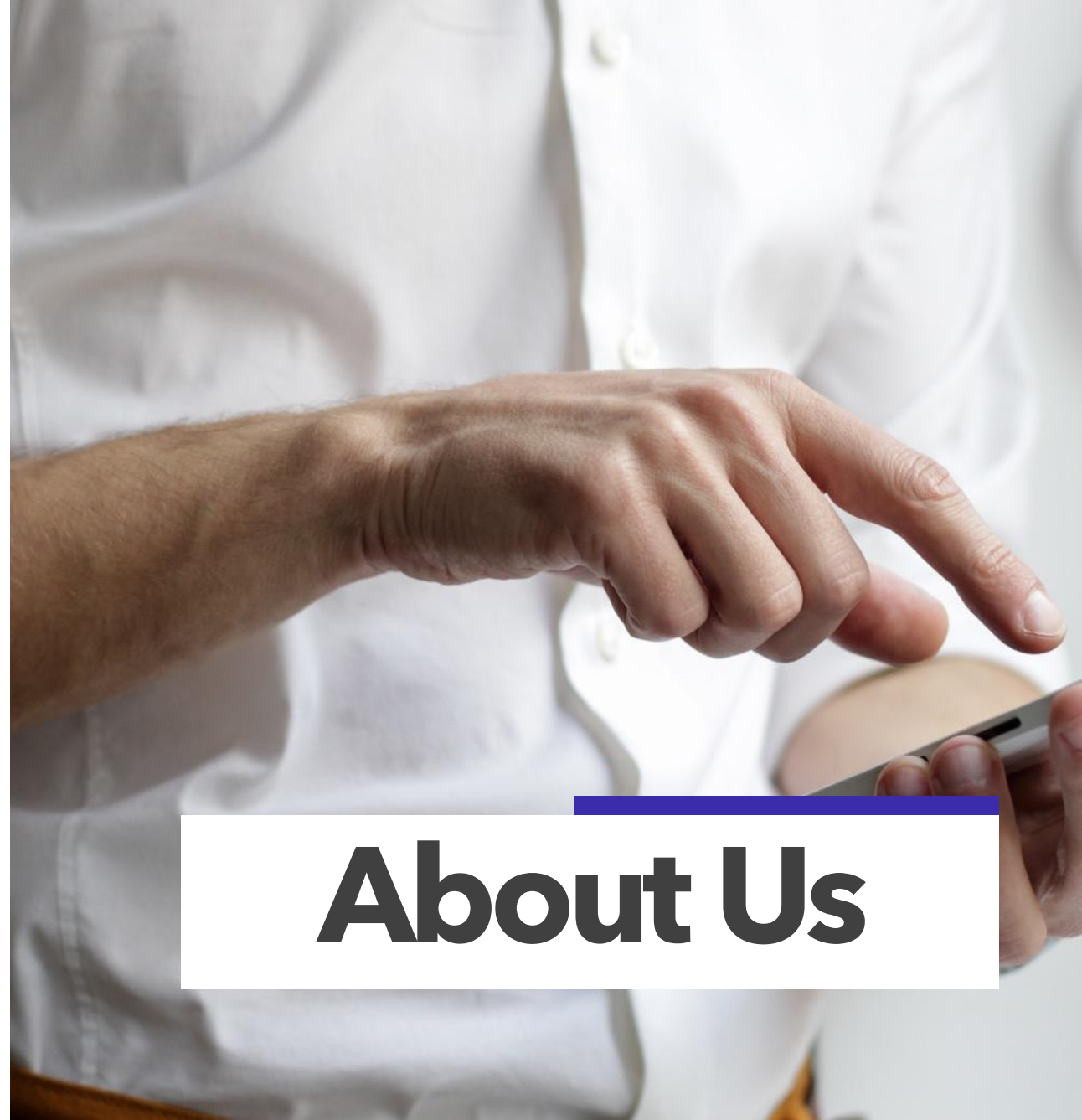


**About Us**

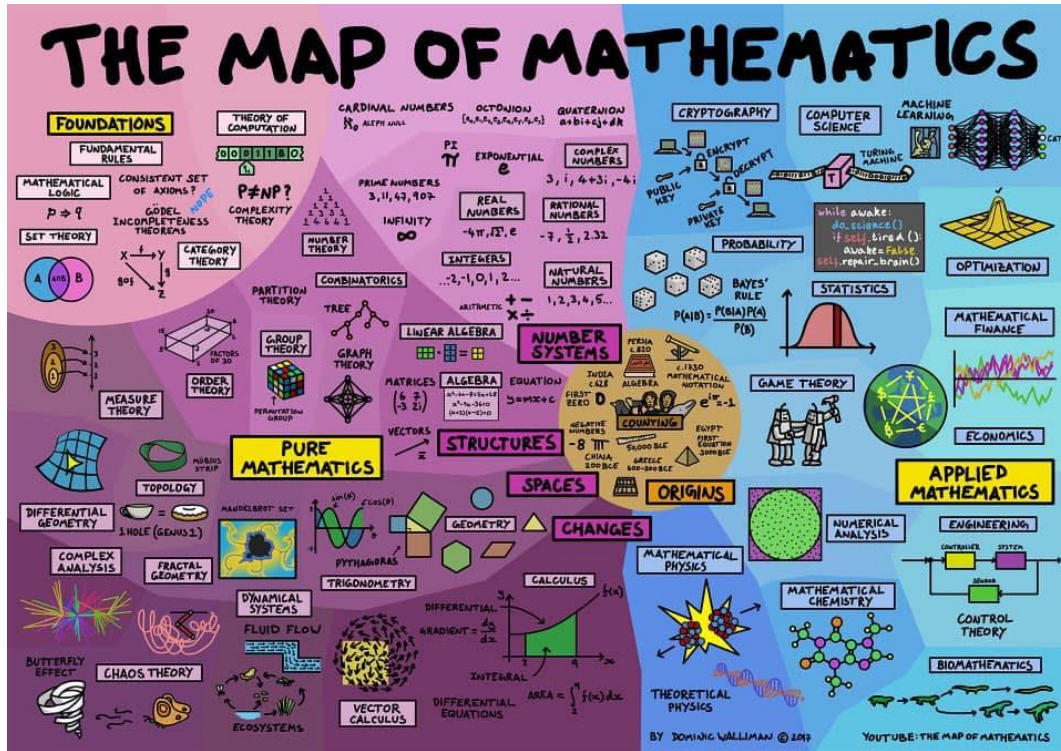




Member: TRUONG NHAT MINH QUANG  
ID: ITITU19194 (70% / 3)



# About Us



Member: TRAN MINH QUANG  
ID: ITITI19192 (70% / 3)

About Us



# Snake Game

## How to play

**Player #1:** Use Arrows to control.

**Player #2:** W(Up), S(Down), A(Left), D(Right).

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**Esc:** Return to GUI - **R:** Replay

**G + A:** Game Paused - **G + L:** Game Played

**M + A:** Music Paused - **M + L:** Music Played

**S + E** = Single Easy Mode; **D + E** = Double Easy Mode;

**S + H** = Single Hard Mode; **D + H** = Double Hard Mode;

**S + B** = Single Brutal Mode; **D + B** = Double Brutal Mode;



# SFML Library

<https://www.sfml-dev.org/index.php>

- Multi-media, multi-platform, and multi-language.
- Tutorial: included in GitHub with the name: Snake-Game-at-IU (public) – Full instruction to install the game



# Food

- Three types of Fruit with random generator:
  1. Apple: 2 points
  2. Melon: 5 points
  3. Strawberry: 10 points

# ADDITIONAL FEATURES





# Music

- Six (06) suitable music included
- Can choose to pause or replay that music again without causing troubles
- Restart function: Reset the game and randomize music

# Game Status

- Immediate troubles from players. How to solve?
- Pause, Replay, Restart, Mode Changing, and Exit button



# Score Database

- Programmers wants players to achieve some extent of satisfaction through score comparison.
- No score is stored because player will continue playing over and over which decrease the working efficiency and attention, causing insomnia and headache if scores are stored





# Game Mode (Part 01)

- Six (06) different Game Mode: Single Easy, Single Hard, Single Brutal, Double Easy, Double Hard, Double Brutal (changeable).
- Differentiating by “Delay” variable, Game Rules, and Obstacles



# Game Mode (Part 02) – Delay variable

- Delay variable determines the speed of snake.
- Easy:  $Delay = 0.15(1 - 05\%)^{int \frac{Time}{30}}$
- Hard:  $Delay = 0.10(1 - 10\%)^{int \frac{Time}{30}}$





# Game Mode (Part 02) – Delay variable

⇒ Most will fail after 15 minutes in Easy Mode and 7.5 - 10 minutes in Hard Mode and 5 minutes after 5 minutes in Brutal.

(Human Reaction ranging from 0.1 s <-> 0.3 s)



Time Passed (s)	Delay (s) in Easy Mode	Delay (s) in Hard Mode
0	0.15	0.1
60	0.1353	0.081
240	0.0995	0.0478
300	0.0898	0.0348
450	0.0694	0.0205
600	0.0537	0.0121
900	0.0323	$4.239 \times 10^{-3}$
1200	0.0193	$1.478 \times 10^{-3}$
1800	$6.91 \times 10^{-3}$	$1.797 \times 10^{-4}$
2400	$2.477 \times 10^{-3}$	$2.185 \times 10^{-5}$
3600	$3.184 \times 10^{-4}$	$3.229 \times 10^{-7}$



# Game Mode (Part 03) – Game Rules

## EASY MODE

- Snake can pass wall, bite himself or other Snake
- Low Speed Initial, less Obstacles (still random)

## HARD MODE

- Snake cannot pass wall, bite himself or other Snake
- High Speed Initial, more Obstacles (still random)



# Game Mode (Part 04) – Obstacles

## EASY MODE

## HARD MODE

- Durations: 20 seconds
  - Durations: 30 seconds
- After 35 seconds passed: After 45 seconds passed:
- ObstacleNumber += 5;      ObstacleNumber += 15;



# Game Mode (Part 05) – Brutal Mode

## Obstacles

- Some obstacles can be repeated so the factual number of obstacles is smaller than the theoretical one.
- $Obstacles = 10(1 + 75\%)^{int \frac{Time}{60}}$

## Speed

- $Delay = 0.10(1 - 10\%)^{int \frac{Time}{20}}$



Time Passed (s)	Delay (s) in Brutal Mode	Number of Obstacles (Theoretical)
0	0.1	10
60	0.0729	17
120	0.0531	30
180	0.0387	53
240	0.0282	93
300	0.0205	164
360	0.015	287
420	0.0109	502
480	$7.977 \times 10^{-3}$	879
540	$5.815 \times 10^{-3}$	1539
600	$4.239 \times 10^{-3}$	2639

# Note

- Obstacles can appear randomly **without warning** to increase the Game Difficulty. But you will only die if you hit the Snake's Head into it. Obstacles will appear again after 15 seconds of disappearing.
- If you are unlucky, **"nhân phẩm kém, thích cà khịa"**, the Obstacle will appear **right on** the Food's place, so you will have to wait.

# CONCLUSION

# WORTH-PLAYING GAMES



# CITATIONS

01. <https://www.sfml-dev.org/index.php>



# THANK YOU

Pham Hoang Minh



ITITIU19031



ITITIU19031@student.hcmiu.edu.vn



Group 01

