Project Case	
DS using C Project	BINUS UNIVERSITY
Periode Berlaku Semester Ganjil 2023/2024 Valid on Odd Year 2023/2024	Software Laboratory Center Assistant Recruitment 24-1

Note: Please focus on the main logic and main feature!

(Splash screen and design are not scored)

Soal

Case

CalyX

CalyX is a simple puzzle game and the objective is to reach the titular number, "2048", by combining tiles with matching numbers. You as a developer asked to make a CalyX with C Programming Language and **Hash Table** with **chaining method** to keep track of all user data.

Main Menu

- This menu contains of 3 menus, which are **New Game**, **Highscore**, **and Exit**.
- Prompt user to input chosen menu. Validate the input must between 1 and 3 inclusively.

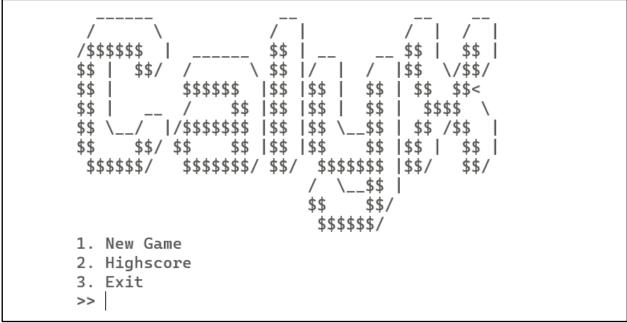


Figure 1. Main Menu

- If user choose New Game (Menu 1), then:
 - o **Prompt** user to **input grid size. Validate** the data must be **4 or 6**.

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```
Input Grid Size [4 or 6]:
```

Figure 2. Input Grid Size

```
Input Grid Size [4 or 6]: 1
Input Grid Size [4 or 6]:
```

Figure 3. Grid Size Validation

- o **Direct** user to **game page**.
- If user choose **Highscore** (**Menu 2**), then:
 - Open "highscore.txt", then:
 - Read all the data in **highscore.txt** with this following format:

UserID#Username#Score

Figure 4. Highscore.txt Format

Store all of the data to chaining hash table with size 25 based on the following key which
could be calculated as follows. You are free to insert to the first item or the last item of
the chaining hash table.

```
Key = X % Y
X: Sum of ASCII Value of UserID
Y: Size of hash table (25)
Example:
UserID: SL123
X: S (83) + L (76) + 1 (49) + 2 (50) + 3 (51)
Y: 25
Key: 309 % 25, therefore key will be 9
```

Figure 5. Hash Key Formula

- o **Display Top 10** player and score with the highest highscore with **descending order**.
- o For **sorting algorithm** you can choose one of the algorithm below:
 - Quick Sort
 - Merge

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No	. ID	Username	Score
1	G0183	Goo	2540
2	CI954	Cir	2500
3	AS643	asdf	2176
4	TE602	Test	132
5	RI766	Ric	128
6	SD961	sdf	52
7	B0049	Воо	12
8	SE835	Seth	0
0	125022	Jacon	10
Pro	ess Enter	to Continue	

Figure 6. Highscore

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- If user choose Exit (Menu 3), then:
 - Display logo and motto.

```
..^... ..^^...
             ... ...:. ......
                   . ^. :..:~~77~~~::..:..
             ::::..~.::.~7~.:::^ ~^:~.::...:^~^:^~^
                  ...^!777^~~!?~^~7:^::...5BGB##&#7.
                .:~!!. .:~^.77?P57P7!^::~::?5B&&#GGG5.
             .:^~~^^: YJJGBGP5YY7J7!^^^?7YG##P7^7#&B~:
     .^~~: ~J55PJ~:. ..~JPBBBY^.
..^7~ .::???. .~!JG&&#J:
.:~7!:. ^Y^. .. !JPB&&#Y:
                                 ..~JPBBBY^. .:.JG!:!!^..
                                              .7!:.^77?!^..
                                                . :7!: ~G5?!:.
  .:~7?7..~!!
.:^777~^::7^
                     .:..^?YP&&&G7
                                                     ~J: .BP7J!:.
                                                       .J! !YYYJ?^.
                       :JB&&#BG^ .
                     ?#&&&&B~
 .:!JJJJ: :7G.
                ?#&&&B~
. .5BBBBBG^
                                                         ?5..^!~~!!:.
.:!YYY5~ .J&Y
                                                          YP :?J!~!^.
.:!J?YJ^..P&!
                    P&&&&&#!
                                                           #7 . ^55? ^~:
               .:.^JGBBBP5Y!^75GBGP5PJYPGPP5YYJ?!^ !&:.:??~?~.
.^7!??^..P#? . . ~#&&&&&J:.. ... . ...
.:!J~~^.?G#5
 .^?5^:.JPBP!
                    .::....!YYY&&&###&&&&YG##&&&&#B5: !&:.^~!5J~.
                                 ^:. ..P&G:^&&&&&&&&

7#^ P&&&&&&G^ :&^ 7?5?!:.

^5^ 7###&#P^ G7..7G5!:.

.7: ~#&&#5~ ~~:.:PY~:.
   .^??:.^^?77..
                                                          PG ~7:JP7:.
   .:^7? .~~J?7!
     .^J5.:!JPBBY
                                     .7: ~#&&#5~
      .^?5~^~:~PBP~.?!~: ^^7~^!^
       .^!5J7..~!B&PJY?J^J?YGY?7!:..^^:?#@&G7.
                                                     .~.::^Y!^.
        ^!5J7..~!bardi:0 0.13...
.:^??J!77JY57 .: :?#BYGG!7~:7G&#5~.
                                                      .~^!J5!:.
                                                  ... ^?Y57:.
          .:~?JY~.... :.^!J^^!7~7PGPJ~.
             :~75P~:. ^^!!^~!JYJ57:..^^....:^!: ...5GP7^.
             ::.:~^7.JY^?77Y5Y7^..::~??5J???5J: :?Y!J5!:.
              . .^.7G&###B5!^:.::...~?J?YB#BY7^:.
                 .^^YJ5###BG5J7!7JYPPGYJ??YPPPY?7~:.
                 ...^~^^.....^~!~!!!!~^^:
                  Breaking and Overcoming Challenges
                Through Courage Hardwork and Persistence
                       ~~ Bluejackets 23-1 ~~
```

Figure 7. Logo and Motto

Gameplay

• **Display** Game Grid, which initially contains **one randomly placed tiles**, with a value of either 2 or 4.

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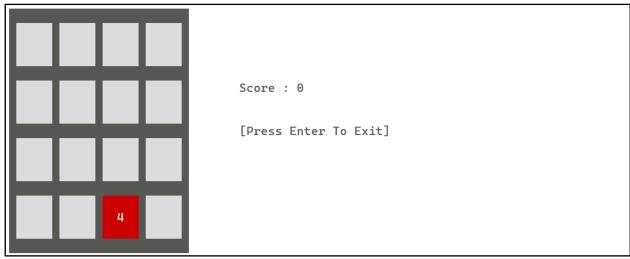


Figure 8. Game Grid

o Below is some information about **grid symbol code**.

Symbol Code	Meaning
219	Wall
\033[0m	RESET
\e[0;30m	Black Color
\e[0;31m	Red Color
\e[0;32m	Green Color
\e[0;33m	Yellow Color
\e[0;34m	Blue Color
\e[0;35m	Purple Color
\e[0;36m	Cyan Color
\e[0;37m	White Color

Table 1. Grid Symbol Information

- The player can swipe in four directions: **up**, **down**, **left**, **or right**. This action moves all the tiles in that direction, sliding them as far as possible until they hit the edge of the grid or another tile.
- Prompt user to input **key W A S D** (Case Insensitive) to **move**.
 - o Below is some information about **swipe movement and other event**.

Key (Case Insensitive)	Event
W	Swipe Up
Α	Swipe Left
S	Swipe Down
D	Swipe Right
ENTER	End Game

Table 2. Event Information

Halaman : 5 dari 7 Page 5 of 7 When two tiles with the same number collide while moving in the same direction,
they merge into a single tile with a value equal to the sum of the two tiles. The sum
of the two tiles will be added to the player score.



Figure 9. Before Merge

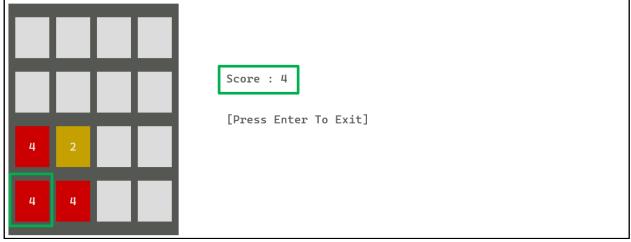


Figure 10. After Merge

- After each swipe, a new tile with a value of 2 or 4 is randomly added to an empty space on the grid.
 - If score less than 1000, the possibility to get 2 is 70% and the possibility to get 4 is 30%.
 - o If score more or equal to 1000, the possibility to get 2 is 30% and the possibility to get 4 is 70%.
- The player's goal is to keep merging tiles and increasing their value.
- If user press 'ENTER', then:
 - o **Prompt** user to **input name. Validate** the name length must be **between 3 to 15**.

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```
Input Name [name length must be between 3-15]:
```

Figure 11. Input Name

```
Input Name [name length must be between 3-15]: as
Input Name [name length must be between 3-15]: asdfasdfasdfasdfffff
Input Name [name length must be between 3-15]: |
```

Figure 12. Input Name Validation

Generate UserID based on the following formula.

UserID Format: XXYYY

XX: Username First Two Character In Upper Case Form

YYY: Random Number Between 0 – 999

Example:

Username: Slausky Random Number: 123

UserID: SL123

Figure 13. Generate UserID

- Validate the UserID must be unique.
- Store the new user data to the first item or the last item of chaining hash table using the formula above.
- Open "highscore.txt" then:
 - Store all the data to the file using the following format.

UserID#Username#Score

Figure 14. Highscore.txt Format

o After store the new user, redirect to main menu.

Please run the EXE file to see the sample program.

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