

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

- **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

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

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	Boo	12
8	SE835	Seth	0

Press Enter to Continue...

Figure 6. Highscore

- **Display** logo and motto.

0-----0
| Breaking and Overcoming Challenges |
| Through Courage Hardwork and Persistence |
| ~~ Bluejackets 23-1 ~~ |
0-----0

Figure 7. Logo and Motto

➤ Gameplay

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

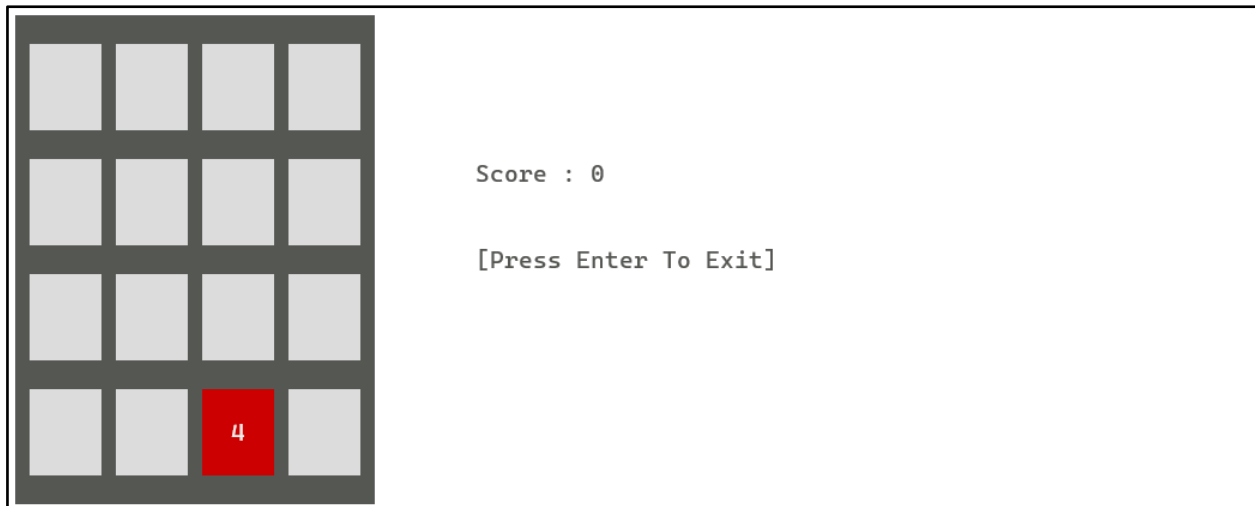


Figure 8. Game Grid

- 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**.
 - Below is some information about **swipe movement and other event**.

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

Table 2. Event Information

- 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**.

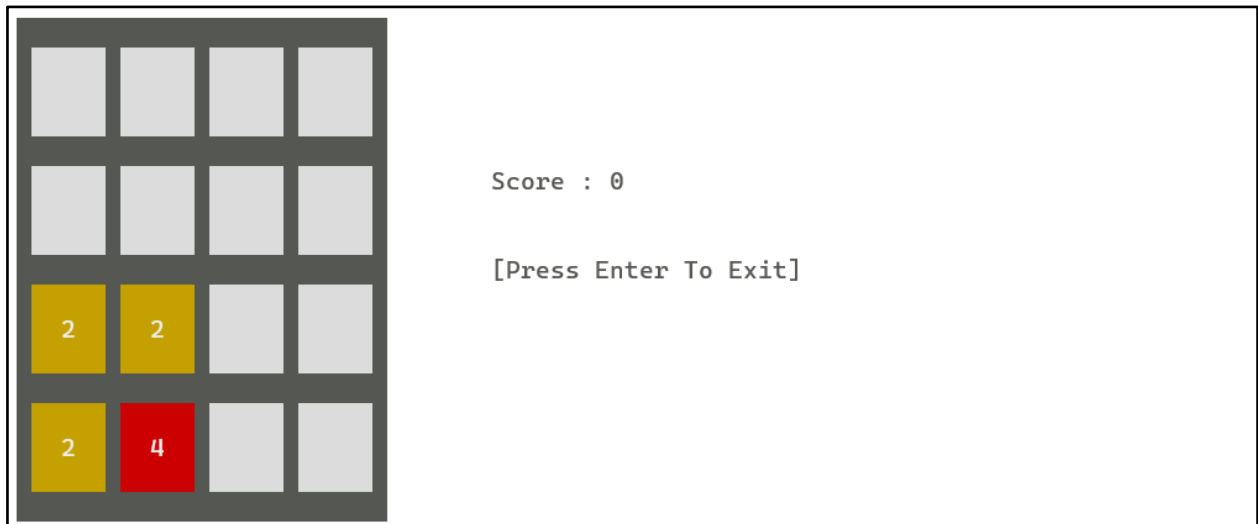


Figure 9. Before Merge

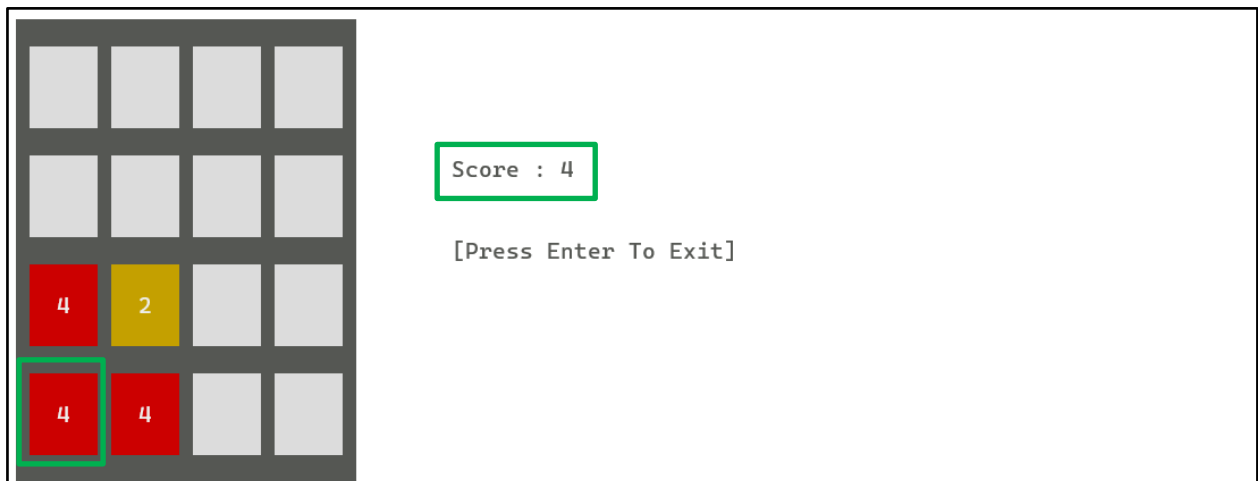


Figure 10. After Merge

- 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%**.
 - 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:
 - Prompt** user to **input name**. **Validate** the name length must be **between 3 to 15**.

```
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]: asdfasdfasdfasdf
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

- After store the new user, **redirect** to **main menu**.

Please run the EXE file to see the sample program.