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# ROULETTE SIMULATOR

## USER MANUAL

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# OVERVIEW

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Welcome to the Roulette Simulator! This device is designed to replicate the excitement and strategy of a classic casino roulette game, allowing you to play and practice your betting skills without any of the actual risks.

With this simulator, you can:

- Choose from a variety of bet types
- Watch the wheel spin and determine the outcome of your bets
- Trade in and manage different chip values as you strategize your bets

Whether you're new to roulette or a seasoned player, this device is an engaging way to enjoy the game and hone your skills. This manual will guide you through setup and gameplay to ensure you get the most out of your experience.

Enjoy the thrill and may the odds be ever in your favor!

# BACKGROUND

American Roulette is a popular casino game that combines strategy, luck, and excitement. It is played on a spinning wheel divided into numbered slots, and the goal is to predict and bet on where the ball will land after the wheel stops spinning. Here is a brief overview of the key aspects of the game:

## THE ROULETTE WHEEL

The American Roulette wheel features 38 numbered slots, including:

- Numbers 1 through 36 alternating in red and black
- Green slots for 0 and 00

The arrangement of numbers is not sequential, but rather designed to distribute values evenly across the wheel.



Fig. 1: American Roulette Wheel

## THE BETTING TABLE

The betting table is where players place their wagers. It corresponds to the numbers on the wheel and includes additional options for betting combinations. Bets are placed using chips of various denominations, and different bet types have their own corresponding payout odds.

		1 - 18						19 - 36																																	
00		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	1st	2nd	3rd
		1 - 12			13 - 24			25 - 36			EVEN		RED		BLACK		ODD																								

Fig. 2: American Roulette Betting Table

## TYPES OF BETS

### Inside Bets (higher payouts, higher risk)

- Straight: Bet on a single number
- Split: Bet on two adjacent numbers
- Street: Bet on three numbers in a row
- Basket: Bet on three adjacent numbers (include at least one zero)
- Corner: Bet on four numbers that form a square
- Top Line: Bet on 00, 0, 1, 2, 3
- Double Street: Bet on six numbers in two rows

### Outside Bets (lower payouts, lower risk)

- Dozens: Bet on a group of twelve numbers (1 – 12, 13 – 24, 25 – 36)
- Columns: Bet on one of the three vertical columns
- Red/Black: Bet on all red or black numbers
- Odd/Even: Bet on all odd or even numbers
- High/Low: Bet on numbers 1–18 (low) or 19–36 (high)

# SETUP

## POWERING ON

1. Connect the NUCLEO-L476RG board to your computer
  - a. Use the provided USB cable to connect the board to a USB port on your computer; ensure the USB connection is secure on both ends
  - b. Once connected, the power LED on the NUCLEO board should illuminate to indicate that the device is powered on

## COMPUTER CONNECTION

1. Open Terminal App/Software
  - a. Launch a VT100 escape code-compatible terminal on your computer
2. Connect device and run terminal screen
  - a. To find the right device, in the terminal type: `ls /dev/cu.*`
  - b. After locating the correct device, run a screen with a baud rate of 115200 to connect to the device by typing:  
`screen /dev/cu.<device name> 115200`  
Ex: to connect a device named "usbmodem141303" to a screen, type:  
`screen /dev/cu.usbmodem141303 115200`
  - c. To quit the terminal screen, type CTRL+A, then CTRL+\
3. Starting screen
  - a. Run the code to the board through the STM32 IDE (or press reset button on board if code is already on it)
  - b. Terminal should load with a starting screen that consists of the wheel, table, betting odds, chip values, and balance, along with a welcome prompt

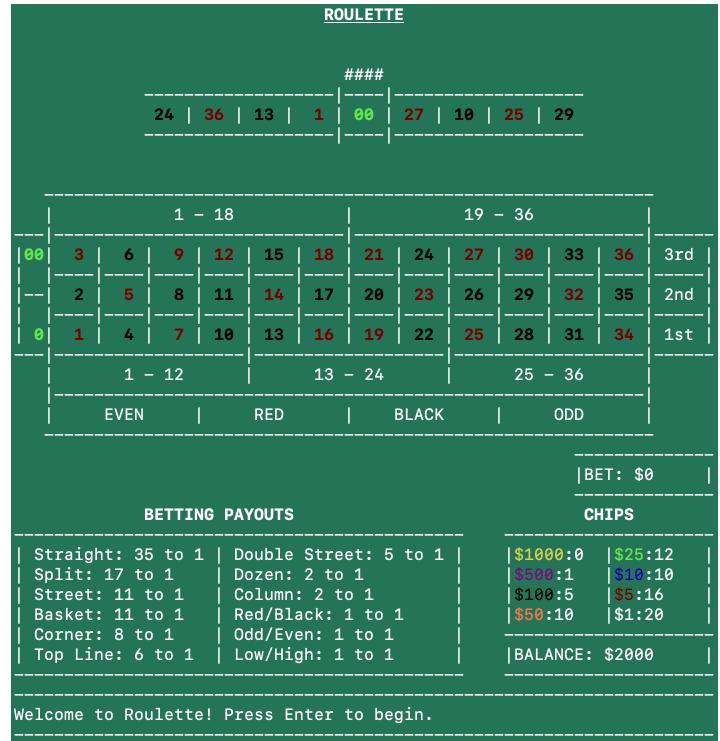


Fig. 3: Roulette Starting Screen

# GAMEPLAY INSTRUCTIONS

After powering on and establishing a connection with your computer, the terminal will display the welcome message: "Welcome to Roulette! Press Enter to begin."

Press the Enter key on your keyboard to proceed to the trading chips stage.

Follow the on-screen prompts for any next steps.

## TRADING CHIPS

Players can exchange their higher-value chips for smaller denominations, providing flexibility when placing bets.

Refer to Fig. 4, which is the display that tracks your current chip inventory and overall balance. This display shows the number of chips available for each denomination, ranging from \$1 to \$1000.

CHIPS	
\$1000:0	\$25:12
\$500:1	\$10:10
\$100:5	\$5:16
\$50:10	\$1:20
BALANCE: \$2000	

Fig. 4: Chip Display

1. After starting the game, the terminal will prompt:  
`Trade in chips? (yes/no) -->`
2. Type **yes** and press Enter to begin trading chips
  - a. If you do not wish to trade chips, type **no** and press Enter to proceed to the placing bet stage
3. The terminal will ask for the chip value you want to trade in:  
`Enter chip value to trade in -->`
4. Type the value of the chip you wish to trade (e.g., 100 for \$100 chips), press Enter
  - a. Ensure you have at least one chip of this value. Refer to the display to check your inventory
5. The terminal will then ask how many of those chips you want to trade in:  
`Enter quantity of $100 chips to trade in -->`
6. Enter the number of chips you wish to trade in and press Enter
  - a. Ensure you have enough chips for the transaction. For example, if the display shows you have 5 \$100 chips, you cannot trade in more than 5
7. The terminal will now ask for the value of the chips you want in return:  
`Enter chip value you want in return -->`
8. Type the desired chip value and press Enter
  - a. Ensure the chip value you want to receive is lower than the value of chips you are trading in

9. If the transaction is valid, the terminal will display a success message. For example, successfully trading in 3 \$100 chips for \$25 chips will return:

Trade in complete! You traded 3 \$100 chips for 12 \$25 chips.

10. The chip display will update to reflect the new chip counts

## ERROR MESSAGES

If something goes wrong during the chip trading process, you may encounter one of the following error messages:

1. **Invalid Chip Value** – The entered chip value is not a valid denomination or does not exist in the game

Invalid chip value! Please enter a valid chip value.

2. **Cannot Trade in \$1 Chips** - \$1 chips cannot be traded for lower denominations because they are the smallest available chips

Cannot trade in \$1 chips! Please enter a higher chip value.

3. **Out of Chips for Selected Value** – You do not have any chips of the selected value. Refer to the chip display for your current chip counts

You are out of \$1000 chips! Please enter a different chip value.

4. **Insufficient Chips** – You do not have enough chips of the specified value to complete the transaction. Refer to the chip display for your current chip counts

Not enough chips to trade in! Please enter a lower quantity.

5. **Lower Value Required for Trade** – The value of the chips you want to trade in must be higher than the value of the chips you want to receive

Chip value must be lower than trade-in chip value! Try again.

6. **Trade-In Not Divisible** – The total value of the chips being traded must evenly divide into the value of the chips being received

Trade-in value must be divisible by the desired value! Try again.

# PLACING BETS

## CHOOSING BET TYPE

Despite players only being able to bet on one type at a time, there is a wide variety of types to choose from, with each corresponding to a different set of rules and payouts.

After trading in chips (or bypassing that process completely), the terminal will prompt you to select one of the available bet types:

```
Choose your bet type (from above) -->
```

Type the name of the bet type exactly how it is in the betting payouts display. After entering your choice, you may be prompted for additional details depending on the bet type.

For **Split**, **Street**, **Basket**, **Corner**, **Double Street**, **Dozen**, and **Column** bets, the terminal will ask which “number” of the bet. For example, when choosing **Split**, the terminal prompts:

```
Enter split number (refer to user manual) -->
```

Refer to the relevant information for each bet type to determine your desired numbers.

Once the bet type is chosen, the corresponding winning numbers will be highlighted on the table display, making it clear which numbers are included in your bet.

## BET TYPES

**Straight** (35 to 1) – A bet on a single number on the wheel. You must enter the number you wish to bet on

```
Enter number (00-36) -->
```

**Split** (17 to 1) – A bet on two adjacent numbers on the betting grid. You must enter the corresponding split number from Fig. 5

1 - 18																		19 - 36																	
3rd						2nd						1st																							
00	4	3	9	6	14	9	19	12	24	15	29	18	34	21	39	24	44	27	49	30	54	33	59	36											
3	6	11	16	21	26	31	36	41	46	51	56	61																							
2	5	8	5	13	8	18	11	23	14	28	17	33	20	38	23	43	26	48	29	53	32	58	35												
0	1	7	4	12	7	17	10	22	13	27	16	32	19	37	22	42	25	47	28	52	31	57	34												
1 - 12						13 - 24						25 - 36																							
EVEN						RED						BLACK						ODD																	

Fig. 5: Split Bet Numbers

**Street** (11 to 1) – A bet on three numbers in a horizontal line on the grid. You must enter the corresponding street number from Fig. 6

1 - 18												19 - 36																		
3rd						2nd						1st																		
00	3	6	9	12	15	18	21	24	27	30	33	36																		
2	5	8	11	14	17	20	23	26	29	32	35																			
0	1	4	7	10	13	16	19	22	25	28	31	34																		
1 - 12						13 - 24						25 - 36																		
EVEN						RED						BLACK						ODD												

Fig. 6: Street Bet Numbers

**Basket** (11 to 1) – A bet on three adjacent numbers that includes at least one zero. You must enter the corresponding basket number from Fig. 7

	1 – 18						19 – 36						
00	3	6	9	12	15	18	21	24	27	30	33	36	3rd
2	2	5	8	11	14	17	20	23	26	29	32	35	2nd
0	1	4	7	10	13	16	19	22	25	28	31	34	1st
	1 – 12						13 – 24						
	EVEN			RED			BLACK			ODD			

Fig. 7: Basket Bet Numbers

**Corner** (8 to 1) – A bet on four numbers that form a square on the grid. You must enter the corresponding corner number from Fig. 8

	1 – 18						19 – 36						
00	3	6	9	12	15	18	21	24	27	30	33	36	3rd
2	2	5	8	11	14	17	20	23	26	29	32	35	2nd
0	1	4	7	10	13	16	19	22	25	28	31	34	1st
	1 – 12						13 – 24						
	EVEN			RED			BLACK			ODD			

Fig. 8: Corner Bet Numbers

**Top Line** (6 to 1) – A bet on the first five numbers: 00, 0, 1, 2, and 3. Typing “Top Line” and Enter automatically sets this bet

**Double Street** (5 to 1) – A bet on six numbers (two adjacent streets). You must enter the corresponding double street number from Fig. 9

	1 – 18						19 – 36																
00	3	1	2	9	3	12	4	15	5	18	6	21	7	24	8	27	9	30	10	33	11	36	3rd
2	2	5	8	11	14	17	20	23	26	29	32	35	2nd										
0	1	4	7	10	13	16	19	22	25	28	31	34	1st										
	1 – 12						13 – 24						25 – 36										
	EVEN			RED			BLACK			ODD													

Fig. 9: Double Street Bet Numbers

**Dozen** (2 to 1) – A bet on one of three groups of twelve numbers (1 – 12, 13 – 24, 25 – 36)

- Enter ‘1’ for numbers 1 – 12
- Enter ‘2’ for numbers 13 – 24
- Enter ‘3’ for numbers 25 – 36

**Column** (2 to 1) – A bet on one of the three vertical columns on the betting grid

- Enter ‘1’ for 1<sup>st</sup> column
- Enter ‘2’ for 2<sup>nd</sup> column
- Enter ‘3’ for 3<sup>rd</sup> column

**Red/Black** (1 to 1) – A bet on whether the winning number will be red or black. Typing “Red” or “Black” and Enter will automatically set this bet

**Odd/Even** (1 to 1) – A bet on whether the winning number will be odd or even. Typing “Odd” or “Even” and Enter will automatically set this bet

**Low/High** (1 to 1) – A bet on whether the winning number will be in the low range (1–18) or high range (19–36). Typing “Low” or “High” and Enter will automatically set this bet

## CHOOSING BET MONEY

After selecting your bet type, you will place your chips for the bet.

1. The terminal will prompt:  

Enter chip value to bet or 'done' -->
2. Type the value of the chip you wish to bet. This value must correspond to one of your available chips
3. The terminal will then ask how many chips of the selected value you want to bet. Ensure you have enough of that chip value in your balance.  

Enter quantity of chips -->
4. You can continue adding chips to customize your bet amount as desired. When you're ready to finalize your bet, type "done"

## ERROR MESSAGES

If something goes wrong during the betting process, you may encounter one of the following error messages:

1. **Invalid Bet Type** – The entered bet type does not match any of the valid options  

Invalid bet type! Choose one from the list above.
2. **Invalid Bet Number** – The entered number is not valid for the selected bet type  

Invalid number! The number you entered does not exist on the table.
3. **Spinning Without Betting** – If you attempt to spin the wheel without placing a bet  

You must bet before spinning the wheel!
4. **Invalid Chip Value** – The entered chip value is not a valid denomination or does not exist in the game  

Invalid chip value! Please enter a valid chip value.
5. **Insufficient Chips** – If you attempt to bet more chips than you currently have of the specified value  

Not enough chips! Please enter a lower quantity or different value.

# SPINNING THE WHEEL

Once the bet is placed, the wheel spinning can be initiated and observed.

1. The terminal will prompt:

Press Enter to spin the wheel...

2. After pressing Enter, the wheel will begin spinning. This is visually represented on the terminal with the numbers scrolling horizontally, simulating the wheel's rotation
  - a. The wheel will complete at least five full rotations before stopping at a randomly selected winning spot
3. While the wheel is spinning, the yellow and blue LEDs will alternate, creating a visual effect to indicate the spinning process
4. When the wheel stops spinning, the winning spot will appear as the "middle spot" on the wheel displayed in the terminal

Spinning...

# RESULTS

If the winning spot on the wheel matches one of your selected bets, you will win; otherwise, you lose.

1. A message will appear at the bottom of the screen, notifying you of the outcome
  - a. If you win, this message will include the total winnings. On a win, the four green LEDs will also illuminate
  - b. If you lose, this message will include the amount you bet and lost. On a loss, the four red LEDs will also illuminate
2. Your chips and balance also dynamically update in the chip display
  - a. If you win, the total winnings are calculated based on the bet type and amount. These winnings are then distributed back to your chip inventory and balance, using the highest possible chip denominations.
  - b. If you lose, the amount you bet stays subtracted from your total balance
3. To play again, press Enter

Congratulations! You won \$8! Press Enter to play again!

Better luck next time! You lost \$500. Press Enter to play again!

# RESETTING THE GAME

If your total chip balance reaches \$0, the terminal will prompt you to reset. Upon reset, your total balance is restored to \$2000, with the original chip distribution.

You are out of chips! Type 'reset' to start over -->