1 Pico W

1. Power on Pico W using USB cable. Connect RUN on pico W to GND. Keep pressing BOOTSEL while removing the RUN-GND wire from GND.Pico W is now ready to be flashed.
2. Login to termux-debian and execute the following commands.

```
cd .platformio/packages
git clone https://github.com/earlephilhower/arduino-pico
cd arduino-pico
git submodule update --init
cd pico-sdk
git submodule update --init
cd ../tools
python3 ./get.py
git clone https://github.com/gadepall/afw/ide/piosetup/codes
cd codes
pio run
```

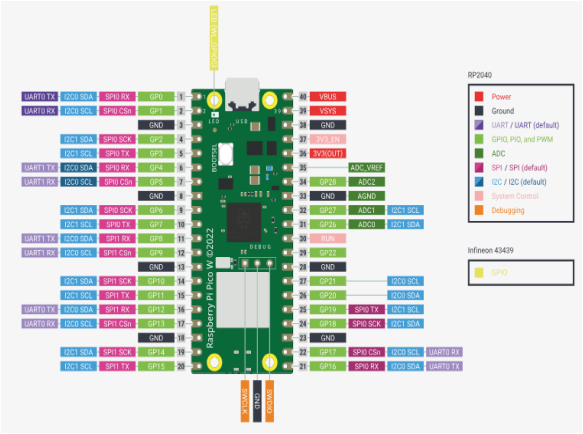

Fig. 1.1: Pin Diagram

3. Connect RUN on pico W to GND. Keep pressing BOOTSEL while removing the RUN-GND wire from GND.Pico W is now ready to be flashed.

Download EtchDroid from playstore.Flash the uf2 file using EtchDroid.

4. The Onboard LED will start blinking.

1.1 Seven Segment

1. Execute the following code to drive the seven segment display.

ide/sevenseg/codes/sevenseg/sevenseg.cpp

2. Make connections according to Table 1.1

pico W	2	3	4	5	6	7	8
Display	a	b	c	d	e	f	g

TABLE 1.1

3. Now generate the numbers 0-9 by modifying the above program.

1.2 7447

1. Now make the connections as per Table 1.2 and execute the following program to drive the seven segment display using 7447 IC.

ide/7447/codes/gvv_ard_7447/gvv_ard_7447.cpp

7447	D	C	B	A
pico W	5	4	3	2

TABLE 1.2

2. W, X, Y, Z are the inputs and A, B, C, D are the outputs. The code below realizes the Boolean logic for B, C and D. Write the logic for A and verify.

ide/7447/codes/inc_dec/inc_dec.ino

3. Now make additional connections as shown in Table 1.3 and execute the following code. Comment.

ide/7447/codes/ip_inc_dec/ip_inc_dec.cpp

Solution: In this exercise, we are taking the number 5 as input to the pico W and displaying it on the seven segment display using the 7447 IC.

	Z	Y	X	W
Input	0	1	0	1
pico W	9	8	7	6

TABLE 1.3

4. Verify the above code for all inputs from 0-9.

1.3 K-Map

1. Execute the code in

ide/7447/codes/inc_dec/inc_dec.cpp

and modify it using the K-Map equations for A, B, C and D. Execute and verify for each case.

1.4 7474

1. Generate the CLOCK signal using the **blink** program in the pico W.
2. Connect the pico W, 7447 and the two 7474 ICs according to Table 1.4 and Fig. 1.2.

	INPUT				**OUTPUT**				CLOCK		3.3V			
	W	X	Y	Z	A	B	C	D						
pico W	D6	D7	D8	D9	D2	D3	D4	D5	D13					
7474	5	9			2	12			CLK1	CLK2	1	4	10	13
7474			5	9			2	12	CLK1	CLK2	1	4	10	13
7447					7	1	2	6			16			

TABLE 1.4

3. Intelligently use the codes in

ide/7447/codes/inc_dec/inc_dec.ino

and

ide/7447/codes/inc_dec/ip_inc_dec.ino

to realize the decade counter in Fig. 1.2.

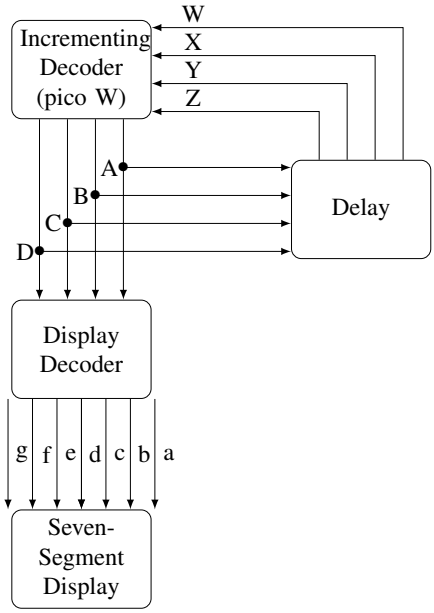

Fig. 1.2