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.

```
git clone https://github.com/gadepall/afw/ide/piosetup/codes
cd codes
pio run
```
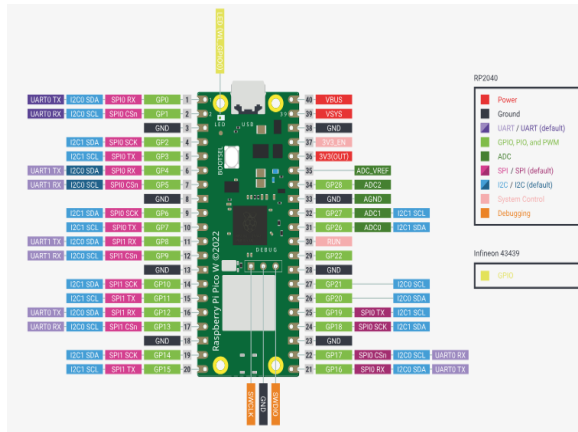

Fig. 1.1: Pin Diagram

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	D13					
pico W	D6	D7	D8	D9	D2	D3	D4	D5						
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
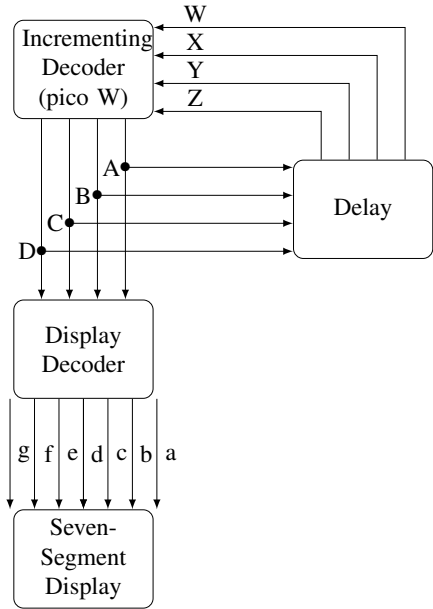
to realize the decade counter in Fig. 1.2.

Fig. 1.2