Name: Yang Hao Mao

CP: 10705881

Q2: Write the pseudocode of the firmware that should be run by the monitoring device installed on each basin.

R:----------

```
import zigbee_module
import sensor_module

# Initialize sensor pins
def ini_pins( ):
    sensor_module.initialize( )

# Initialize Zigbee module
def ini_zigbee( ):
    zigbee_module.initialize( )

# Read sensors
def read_luminosity_sensor( ):
    luminosity = sensor_module.read_luminosity( )
    return luminosity

def read_sugar_sensor( ):
    sugar_content = sensor_module.read_sugar_content( )
    return sugar_content

def read_pH_sensor( ):
    pH_lv = sensor_module.read_pH( )
    return pH_lv

# Check ZigBee transmission availability
def ZigBee_transmission_available( ):
    if zigbee_module.is_connected( ):
        return True
    else:
        return False

# Send data packet via Zigbee
def send_data_packet(data_packet):
    zigbee_module.send(data_packet)

# Main function
def main( ):
    # Initialize sensors and Zigbee module
    ini_pins( )
```

```
ini_zigbee( )

while True:
        # Measure luminosity, sugar content and pH level
        luminosity = read_luminosity_sensor( )
        sugar_content = read_sugar_sensor( )
        pH_lv = read_pH_sensor( )

        # Package data
        data_packet = {
            "luminosity": luminosity,
            "sugar_content": sugar_content,
            "pH_lv": pH_lv
        }

        # Attempt to transmit data to central monitoring system via ZigBee
        transmission_successful = False
        while not transmission_successful:
            if ZigBee_transmission_available( ):
                if send_data_packet(data_packet):
                    # Transmission successful
                    transmission_successful = True
                else:
                    # Transmission failed, retry after a delay (60 seconds)
                    time.sleep(60)
            else:
                # ZigBee transmission not available, wait for next interval (1 hour)
                time.sleep(3600)

        # Wait for next sensor reading interval (1 hour)
        time.sleep(3600)
```