

**DL210A**  
**Fingerprint Door Lock**  
**Operations Manual**  
V4.0



***ArrowVision***  
**YOUR KEYS ARE ON YOUR FINGERTIPS**

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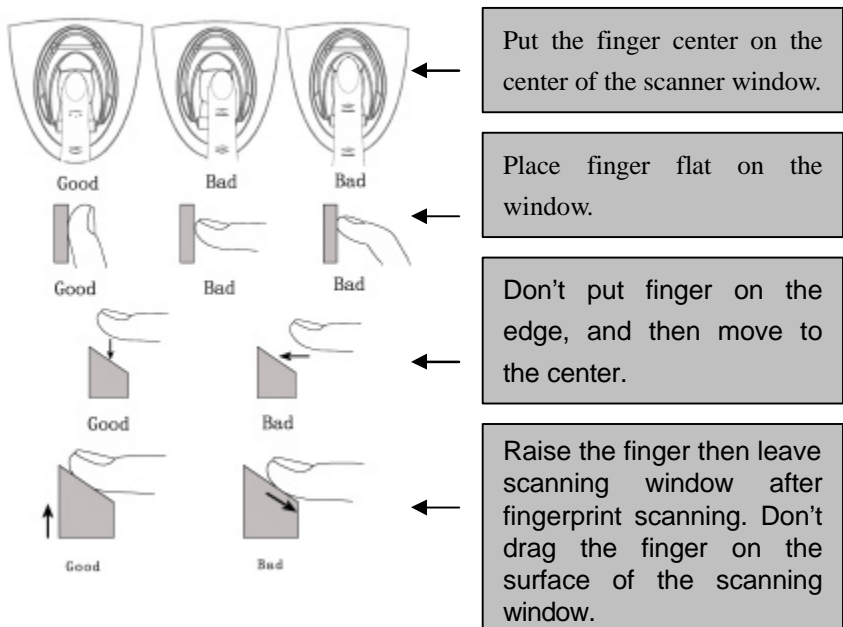
**Congratulations! You are the owner of a state-of-the-art door lock featuring:**

- Fingerprint identification for keyless access
- Storage of fingerprints for up to 50 users
- Attractive, self-contained unit; no external wiring
- Programmable at the door with no computer or external devices
- Manual mode for no-lock access when desired
- Key override to conform to regulations
- Powered by AA batteries (typically lasting two years)
- Interchangeable with Schlage/Kwikset cylindrical plus deadbolt lock sets

## **1. Introductory Notes**

- 1.1. As with many advanced technologies, the use of biometrics for identification involves a learning process. The Shepherd 210 uses exciting technology and design that allows the opening of a locked door simply by pressing a finger on the lock, but users must learn the best positioning and pressure to use.
- 1.2. Generally, the center of the vortex of the fingerprint pattern is the key data point; ideally, it is placed in the center of the small glass window in a consistent way. Your finger should be flat, motionless and held with firm pressure in the same way each time. See Appendix for some guiding drawings.
- 1.3. A very firm pressure when placing the finger gives the best image, but the finger must not move during scanning.

- 1.4. Moist fingers give better images than dry ones. If on cold, dry days you have difficulty, for example, try moistening your finger with your breath or a little moisture.
- 1.5. Very dirty fingers are obviously not recommended, not only for obscuring the fingerprint but also for the risk of scratching the window.
- 1.6. The Shepherd 210 allows setting of security thresholds to determine how precisely you must place your finger to open the lock, thus giving customers a range in the tradeoff between security and convenience.
- 1.7. The attractive dust cover is just that. It has no effect on the electronic system and can be removed if the lock is installed on an inside door where dust protection is not necessary. However, it does hide the override key hole.



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## 2. Definitions and Explanations

- 2.1. **Outside** and **Inside** – the two sides of the lock corresponding respectively to the fingerprint window side and the internal side with the programming buttons. See Figure 1. When you slide the dust cover up on the **Outside** you will uncover the **Power On** button. Both **Inside** and **Outside** parts of the lock have **Lock** buttons that extend the deadbolt, although the **Outside** one (oval shape) is unmarked. The **Inside** part also has an **Unlock** button to retract the deadbolt. There are also three programming buttons (STORE, DELETE, and SELECT) on **Inside** of lock.

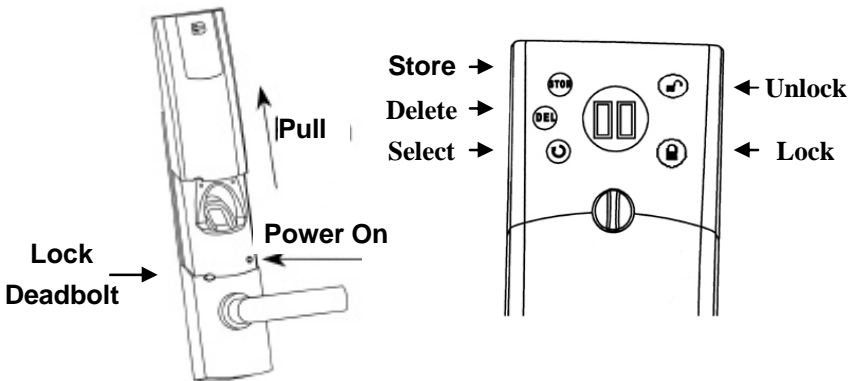


Figure 1

- 2.2. **Registering or Programming of Fingerprints** – This is the process of acquiring the image of fingerprints of authorized persons and storing them into the lock's memory. (Also called Enrolling in biometrics language.) Two images of each finger are scanned in the process, with the same finger being placed two separate times on the window. (Section 4)

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- 2.3. **Power Off/Time Out** – The lock maximizes both security and battery life by automatically powering off if no action is taken for 5 to 10 seconds (depending on function), which the user will hear as a motor noise inside the lock. During the fingerprint registration and other programming functions, the **time out** function requires you to move right along in the programming sequence. Dilly-dallying too long will mean you must start over in the sequence.
- 2.4. **Manual / Unlocked Operation** – The Shepherd 210 can be set to an unlocked state so users can open the door without engaging the fingerprint identification system. (Section 9.4)
- 2.5. **Security Levels** – Five thresholds are available to optimize between convenience in operating lock versus stringency of security in matching fingerprint images. (Section 3)
- 2.6. **Management Levels** – The Shepherd 210 has three permission levels: **Administrator, Supervisor** and **User**. They are designated and identified by ID numbers that correspond to their stored fingerprints as follows:
- 2.6.1. **Administrators:** ID numbers 1 through 5
- 2.6.2. **Supervisors:** ID numbers 6 through 10
- 2.6.3. **Users:** ID numbers 11 through 50
- 2.6.4. In general, the **first two levels** can add/delete fingerprints on levels below theirs. The **Administrators** can, in addition, add/delete their own level plus mass-erase all stored fingerprints.
- 2.6.5.** The first two people Registered will be automatically assigned Administrator IDs. Thereafter, either of the first two Administrators can designate the level for each new registrant. If no designations are made, the new registrants will be assigned

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ID numbers as Users, i.e. IDs 11 through 50. (This is because for most applications, only two management levels are needed: Administrator and User.)

	Administrator IDs: 1 – 5	Supervisor IDs: 6 - 10	User IDs: 11 - 50
Mass erase	X		
Add same level	X		
Delete same level	X		
Add below level	X	X	
Delete below level	X	X	
Open door	X	X	X
Check current ID	X	X	X

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## 3. Setting Security Threshold Level

- 3.1. Five triggering thresholds are available: S0 through S4. Lowest level is S0, with increasingly more stringent thresholds up to S4.

At S0, which is the TRAINING mode, the algorithm matches a minimal number of fingerprint characteristics and therefore is more forgiving in terms of exact placement of finger, dirt on the finger, and image quality, etc. It also means there is the risk that a random fingerprint could be matched with a registered image, so we recommend increasing threshold after you are getting familiar to using the lock.

At S4, the fingerprint image must match perfectly with a registered fingerprint, which means there is no risk of a false acceptance, but the users must learn to place their fingers consistently and present an excellent image in order to be admitted. S1, S2 and S3 are intermediate levels.

### 3.2. Setting Security/Threshold Levels

- 3.2.1. If no fingerprints have been registered, press **Power** button on Outside (hear 2 beeps)
- 3.2.2. Press **STOR**, **DEL** and **C (Select)** buttons on Inside simultaneously until the display shows 00 or Sx (x=0,1,2,3 or 4)
- 3.2.3. Release the three buttons, then press the **C Select** button to cycle through S0– S1– S2– S3–S4, etc. Set at S0 to start, which will ease the learning process. (After you can activate the lock almost every time, you can upgrade the security to a higher level for your purposes.)

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- 3.2.4. Press **STOR** again to set the chosen security level.
- 3.2.5. If fingerprints are already registered and stored, it is necessary for an Administrator to first access the lock with his/her fingerprint, then proceed with the three buttons per Step 3.2.2 above.
- 3.2.6. Only one security level is set for the lock at a time. Different security levels cannot be set for different individuals.

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## 4. Registering Fingerprints

- 4.1. Hint: In order to register fingerprints, the operator will be operating buttons and the scanning window on both sides of the lock. By becoming familiar with the location of buttons as shown in Figure 1, as well as the sequence of operations, the operator will more easily accomplish the registration without being “timed out” as mentioned above.
- 4.2. On the **Outside**, you will slide up the dust cover and use the **Power On** button and the fingerprint scanning window.
- 4.3. On the **Inside**, you will be using the **STOR**, **DEL** and **C** (Select) buttons.
- 4.4. On the first two registrations, there is no need to assign management levels as they will be Administrators automatically, but on subsequent registrations, have in mind what level you wish to assign and the range of ID numbers defining the levels. (Review Para. 2.6 above.)
- 4.5. Hint: Before starting the procedure for registration, decide on what finger you wish to use and practice placing the finger onto window in the same way you intend to open the door later. Practicing will give you a feel for the window and how to put the center of your vortex onto the center of the window.
- 4.6. Procedure for registering first Administrators:**
  - 4.6.1. Slide open dust cover
  - 4.6.2. Press **Power-On** button (Outside) (hear one long beep)
  - 4.6.3. Press and hold **STOR** (Inside) for about 3 seconds until a long beep

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- 4.6.4. Press chosen finger very firmly onto window, stay motionless, and press and hold **STOR** button again with your other hand until a long beep sounds again and scanner starts scanning your finger
  - 4.6.5. When scanner goes off and a short beep sounds, pick up and replace the same finger firmly for a second scan, which starts automatically
  - 4.6.6. When TWO short beeps sound, congratulations! Your fingerprint was successfully registered.
  - 4.6.7. If you hear THREE beeps, the fingerprint was NOT registered, due to a poor image, movement or other reasons. Start at Step 4.6.2 and try again if you heard a motor noise and the power has timed out. If power is still on, start over at Step 4.6.3.
  - 4.7. After registration, test to see that you can activate the lock per the next section before you shut the door and maybe lock yourself out!
  - 4.8. Hint: You can register yourself or any other person, such as a young girl, several times as if she were different people, using the same finger. This way she will have a higher probability of activating the lock even if she varies her finger position at entry.

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## 5. Unlocking the door with your fingerprint

(Included here for convenience; also in Door Operation Section 9.)

- 5.1. Press **Power On** button (Outside)
- 5.2. Immediately place your chosen finger firmly on the window exactly as you did during registration
- 5.3. If successful, the green light flashes, there is a beep and the deadbolt will retract automatically. You will have 5 seconds to push down on the door handle. (If the deadbolt was not extended, you can see the green light flash and hear a noise indicating the door mechanism is being activated after accepting a proper fingerprint.)
- 5.4. If there are **three** beeps, the fingerprint was rejected. This means the finger was positioned and/or pressed in a way that did not match the registration. Simply press the Power On button again and place your finger again. With a little practice, you will unlock the door every time. (Note: Section 3 describes how to set the threshold level, and how to trade-off ease of acceptance with tight security.)
- 5.5. **Hint:** If you have difficulty activating the lock and your rejection rate is more than half the time, consider registering a different finger, different pressure/position, etc. A simple **mass delete** can be done per Section 8.

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## 6. Display

- 6.1. The LED displays different information depending on if you are in a pure display mode or if you have just finished a programming function such as registering fingerprints.
- 6.2. When in the Programming Mode, immediately after registering fingerprints, you can press the Select button and see the NEXT AVAILABLE IDs of the three categories of people: Administrator, Supervisor or User. For example, if you have two Administrators and three Users already registered and you just finished adding a fourth User, pressing the Select button will show: 15 – 3 – 5
- 6.3. In the pure Display mode, you can verify the ID of the person who just unlocked the lock. Immediately after a fingerprint verification, press the Select button. The Display will then show the entering ID, alternating with the remaining number of available spaces in the lock memory. For example, if there are two Administrators and the last of four Users just entered, the display would show: 04 – 44

## 7. Registering additional fingerprints

- 7.1. After the first two fingerprints are registered as Administrators, additional fingerprints can be registered by any Administrator (or Supervisor.)
- 7.2. The Administrator should advise the new registrant on the proper method of placing the finger in the scanning window and the sequence of steps per Section 4.5 and 4.6 above
- 7.3. The Administrator should know what level he/she wants to assign to the new registrant. (Review Section 2.6)

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- 7.4. The Administrator first gains access to the system per Section 5 above.
  - 7.5. Immediately after successfully unlocking the door (before time out of the power), press and hold the **STOR** button for 3 seconds (long beep will sound)
  - 7.6. Press the **G Select** button repeatedly to select the desired ID for the new person. The display will show the next available IDs in each of the three groups. Remember that IDs 1 thru 5 are **Administrators**, IDs 6 thru 10 are **Supervisors** and IDs 11 thru 50 are **Users**. (Ref. Section 2.6 above)

For example, if only two Administrators have been registered, they will have used up 01 and 02. Upon registering a third person, pressing repeatedly on the Select button will display: 11 – 06 – 03. These are the next available IDs in the three categories. If you wish this person to be at the **Supervisor** level, for example, you would cycle the three available choices to 06, the next available ID number in the **Supervisor** category.

Note: The ID number must be selected at this time. A fingerprint image cannot have its management level changed after registering.

- 7.7. Make a record of ID numbers for each individual. This is needed a user ID later if you wish to delete an individual—it will be by ID number. A user ID list from is provided at the end of this manual for your convenience.
- 7.8. Press **STOR** for about 3 seconds again, and have new registrant place finger firmly and properly in scanning window. You will hear a long beep and see the scanning of the finger. At the short beep, remove and replace finger onto window for a second scan.

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7.9. When 2 beeps sound, that person's fingerprint was successfully registered.

The display should show 03 – 11 – 07. (The next available Supervisor ID is now 07 since you just used up 06)

7.10. If 3 beeps sound, the registration was not successful. You can immediately press **STOR** until a long beep (about 3 seconds) and try again from Step 7.8 above. However, if the power has Timed Out, and you hear the motor sound, then you must start over from Step 7.4 above.

7.11. After a successful registration, you can immediately register another person starting with Step 7.5 above, or if Timed Out, start at Step 7.4.

7.12. After registrations, wait about 10 seconds for the lock to Time Out before trying to test the fingerprint access system.

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## 8. Deleting Fingerprints

### 8.1. Mass Delete with only two Administrators registered

- 8.1.1. While holding the **DEL** button, press the Power button and hold
- 8.1.2. Listen for long beep followed by two beeps. Display will show **UU**.

### 8.2. Mass Delete with more than two fingerprints registered

- 8.2.1. One of the Administrators must first perform an unlocking procedure per Section 5.
- 8.2.2. Immediately after the Administrator is successfully verified, press the **C Select** button once and release, then press both **DEL** and **STOR** buttons simultaneously for about 3 seconds. Display will show **UU**.

### 8.3. Deleting individual fingerprints

- 8.3.1. Administrators can delete anyone. Supervisors can delete IDs on the User level. Users cannot delete.
- 8.3.2. The Administrator or Supervisor must know the ID number of the person being deleted.
- 8.3.3. The Administrator or Supervisor first verifies his/her fingerprint and unlocks the lock per Section 5.
- 8.3.4. Quickly (before time out) press **DEL** button for about 3 seconds until you hear a long beep.
- 8.3.5. Press the **C Select** button repeatedly until the ID of the person being deleted is displayed.

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8.3.6. Press the **DEL** button again for about 3 seconds until the long beep.

8.3.7. That individual has been deleted.

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## 9. Door Operation

### 9.1. Batteries

- 9.1.1. Six alkaline AA batteries will operate the door for approximately two years under typical use.
- 9.1.2. A Low Battery Alert is indicated by four extra beeps after the **Lock or Unlock** buttons are pushed, and after unlocking by fingerprint ID. After the low battery alert, there will be approximately 50 more door openings or equivalent operations left.
- 9.1.3. To change batteries, remove the battery cover. Remove battery pack by pulling straight out.

### 9.2. Normal Operation From Inside

- 9.2.1. There are **Lock** and **Unlock** buttons clearly marked on the inside of the lock, which apply only to the deadbolt. Pressing the **Lock** button will extend the deadbolt. Pressing the **Unlock** button will retract it.
- 9.2.2. The cylindrical (lower) lock is automatically locked for people on the outside until it is unlocked by fingerprint as described below. It is not locked for people on the inside.

### 9.3. Normal Operation From Outside – Using fingerprint to gain access

- 9.3.1. Press **Power On** button (Outside)
- 9.3.2. Immediately place your chosen finger on the window exactly as you did during registration. The scanner will scan your finger.

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9.3.3. If successful, there is a beep and the deadbolt will retract automatically. You will have 5 seconds to push down on the door handle.

9.3.4. If there are **three** beeps, the fingerprint was rejected. This means the finger was positioned and/or pressed in a way that did not match the registration. Simply press the Power On button again and place your finger again. With a little practice, you will unlock the door every time. (Note: Section 3 describes how to set the threshold level to optimize the trade-off between ease of acceptance and tightness of security.)

9.3.5. **Hint:** If you have difficulty activating the lock and your rejection rate is more than half the time, consider re-registering of your fingerprint with a different finger, more pressure, different position, etc. If you had successfully registered your fingerprint, but cannot open the lock, you may want to reregister your fingerprint with a better image. To start over with an empty lock, you can perform a **mass delete** per Section 8.

#### 9.4. To Keep Door Always Unlocked

9.4.1. After the lock is unlocked and while power is still on, press the **C Select** button **TWICE** then press the **Unlock** button. A long “beep” will sound and the lock will remain unlocked.

9.4.2. To return to normal operation, press **Lock** button (inside or outside).

Note: This function is available with firmware Version 3.1 that shipped approximately February 18. (Version 3.1 is marked on inside of lock.)

#### 9.5. Emergency Unlocking From the Outside – Using Emergency Key

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9.5.1. Possible reasons for use of emergency procedures:

9.5.1.1. Registered fingerprint is injured and door cannot be opened

9.5.1.2. Low battery indicator was ignored and batteries are dead. (Note: Batteries are replaced from the Inside.)

9.5.1.3. Fingerprint ID system is not working

9.5.2. The same spare key is used for the deadbolt and the cylindrical lock. Both keyholes are normally hidden from view, and are accessed from the Outside.

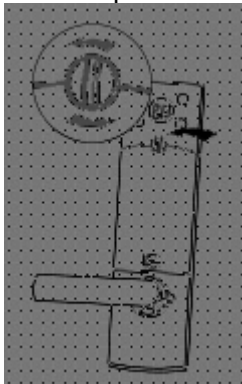
9.5.3. For the dead bolt, slide up dust cover, then remove it completely to expose the keyway. (Cover pops off by pulling out on sides.)

9.5.4. For the latch, use a pocket knife or tiny screw driver to pry off the round metal cap on door handle to expose the keyway.

## **9.6. Emergency Retracting of Deadbolt From the Inside**

9.6.1. Only the deadbolt requires an emergency procedure, as the cylindrical lock is not locked from the Inside.

9.6.2. Turn the deadbolt opener to manually retract the deadbolt.



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## 10. LED Display

10.1. The display shows three types of information:

10.1.1. Memory status: **UU** = memory is empty; **FU** = memory is full (has all 50 users registered)

10.1.2. Security level: S0 through S4 (See Section 3.1)

10.1.3. IDs assigned (See Section 2.6)

## 11. Troubleshooting

11.1. **Problem:** 3 beeps and 3 flashes of the red LED show failure when registering fingerprint or when attempting to unlock door

Possible Cause	Solution
The finger was not pressed on window in time – the lock had timed out.	Repeat the procedure, but put finger on more quickly
The finger was not positioned as previously registered	Repeat the procedure and vary the positioning of the finger
The finger is dirty, calloused or otherwise not giving a good image	If registering, try a different finger. If unlocking, clean finger
The batteries are depleted; low voltage signal sounds.	Change batteries

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**11.2. Problem: System does not turn on when Power on button is pushed**

<b>Possible Cause</b>	<b>Solution</b>
The batteries are depleted; low voltage signal sounds.	Change batteries
The batteries were not installed correctly.	Check that all batteries are in equally good condition and have polarities correct.

**11.3. Problem: The system does not respond to buttons**

<b>Possible Cause</b>	<b>Solution</b>
The batteries are depleted; low voltage signal sounds.	Change batteries
You are changing tasks too fast and need to allow power to time out between certain tasks	Let lock time out between tasks
The system is confused by wrong sequences of buttons	Allow lock to time out and try again.

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**11.4. Problem: The management level designations are incorrect**

<b>Possible Cause</b>	<b>Solution</b>
Levels were not set up before registration	Delete and Re-register incorrect fingerprints with proper management levels selected prior to scanning of fingers, or  Delete all fingerprints and re-register everyone.

## 12. Specifications

<b>Fingerprint Management Unit</b>	
Fingerprint capture type	CMOS Optical
Capacity	50 users
Verification Type	1: N
Scanning time	< 0.4s
Recognition time	< 0.2s/per fingerprint
False Accept Rate (FAR)	< 1/100000
False Reject Rate (FRR)	< 3/100
Translation tolerance	± 0.1"
Rotation tolerance	< ±15°
Power Supply	AA-size alkaline battery x 6 (9VDC)
Dimensions	Outside: 10 13/16" x 3" x 1 23/32"
	Inside: 10 13/16" x 3" x 1 7/16"
	Lock tongue: 3 15/16" x 2 3/8" x 1"
Weight	10 lbs
<b>Environments</b>	
Operating Temperature	32°F - 113°F
Humidity	10%-85%
Door thickness	1 1/2" – 2 5/32"
Door edge width	> 4 17/32"

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### USER ID LIST

<u>ID</u>	<u>Name</u>	<u>ID</u>	<u>Name</u>	<u>ID</u>	<u>Name</u>
1		20		39	
2		21		40	
3		22		41	
4		23		42	
5		24		43	
6		25		44	
7		26		45	
8		27		46	
9		28		47	
10		29		48	
11		30		49	
12		31		50	
13		32			
14		33			
15		34			
16		35			
17		36			
18		37			
19		38			

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