Dell Vostro 5581

Service Manual

Notes, cautions, and warnings

ⓘ | **NOTE: A NOTE indicates important information that helps you make better use of your product.**

△ | **CAUTION: A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.**

⚠ | **WARNING: A WARNING indicates a potential for property damage, personal injury, or death.**

Contents

Working on your computer

Safety instructions

Use the following safety guidelines to protect your computer from potential damage and to ensure your personal safety. Unless otherwise noted, each procedure included in this document assumes that the following conditions exist:

- You have read the safety information that shipped with your computer.
- A component can be replaced or, if purchased separately, installed by performing the removal procedure in reverse order.

⚠ **WARNING: Disconnect all power sources before opening the computer cover or panels. After you finish working inside the computer, replace all covers, panels, and screws before connecting to the power source.**

⚠ **WARNING: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage**

⚠ **CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.**

⚠ **CAUTION: To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface at the same time as touching a connector on the back of the computer.**

⚠ **CAUTION: Handle components and cards with care. Do not touch the components or contacts on a card. Hold a card by its edges or by its metal mounting bracket. Hold a component such as a processor by its edges, not by its pins.**

⚠ **CAUTION: When you disconnect a cable, pull on its connector or on its pull-tab, not on the cable itself. Some cables have connectors with locking tabs; if you are disconnecting this type of cable, press in on the locking tabs before you disconnect the cable. As you pull connectors apart, keep them evenly aligned to avoid bending any connector pins. Also, before you connect a cable, ensure that both connectors are correctly oriented and aligned.**

ⓘ **NOTE: The color of your computer and certain components may appear differently than shown in this document.**

Turning off your computer — Windows 10

⚠ **CAUTION: To avoid losing data, save and close all open files and exit all open programs before you turn off your computer or remove the side cover.**

1 Click or tap ⊞.

2 Click or tap ⏻ and then click or tap **Shut down**.

   ⓘ **NOTE: Ensure that the computer and all attached devices are turned off. If your computer and attached devices did not automatically turn off when you shut down your operating system, press and hold the power button for about 6 seconds to turn them off.**

Before working inside your computer

To avoid damaging your computer, perform the following steps before you begin working inside the computer.

1 Ensure that you follow the Safety Instruction.
2 Ensure that your work surface is flat and clean to prevent the computer cover from being scratched.

3   Turn off your computer.

4   Disconnect all network cables from the computer.

> △ **CAUTION: To disconnect a network cable, first unplug the cable from your computer and then unplug the cable from the network device.**

5   Disconnect your computer and all attached devices from their electrical outlets.

6   Press and hold the power button while the computer is unplugged to ground the system board.

> ⓘ **NOTE: To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface at the same time as touching a connector on the back of the computer.**

After working inside your computer

After you complete any replacement procedure, ensure that you connect any external devices, cards, and cables before turning on your computer.

1   Connect any telephone or network cables to your computer.

> △ **CAUTION: To connect a network cable, first plug the cable into the network device and then plug it into the computer.**

2   Connect your computer and all attached devices to their electrical outlets.

3   Turn on your computer.

4   If required, verify that the computer works correctly by running **ePSA diagnostics**.

Technology and components

ⓘ **NOTE:** Instructions provided in this section are applicable on computers shipped with Windows 10 operating system. Windows 10 is factory-installed with this computer.

Topics:

- DDR4
- USB features
- USB Type-C
- Intel Optane memory
- Intel UHD Graphics 620
- Nvidia GeForce MX130 equivalent

DDR4

DDR4 (double data rate fourth generation) memory is a higher-speed successor to the DDR2 and DDR3 technologies and allows up to 512 GB in capacity, compared to the DDR3's maximum of 128 GB per DIMM. DDR4 synchronous dynamic random-access memory is keyed differently from both SDRAM and DDR to prevent the user from installing the wrong type of memory into the system.

DDR4 needs 20 percent less or just 1.2 volts, compared to DDR3 which requires 1.5 volts of electrical power to operate. DDR4 also supports a new, deep power-down mode that allows the host device to go into standby without needing to refresh its memory. Deep power-down mode is expected to reduce standby power consumption by 40 to 50 percent.

DDR4 Details

There are subtle differences between DDR3 and DDR4 memory modules, as listed below.

Key notch difference
The key notch on a DDR4 module is in a different location from the key notch on a DDR3 module. Both notches are on the insertion edge but the notch location on the DDR4 is slightly different, to prevent the module from being installed into an incompatible board or platform.
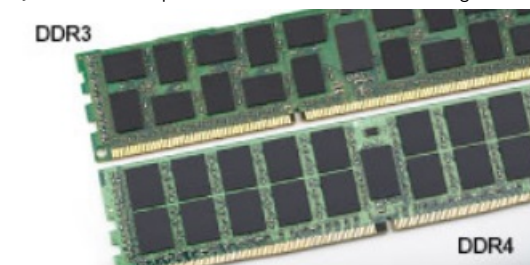
Figure 1. Notch difference

Increased thickness
DDR4 modules are slightly thicker than DDR3, to accommodate more signal layers.

Figure 2. Thickness difference

Curved edge

DDR4 modules feature a curved edge to help with insertion and alleviate stress on the PCB during memory installation.

Figure 3. Curved edge

Memory Errors

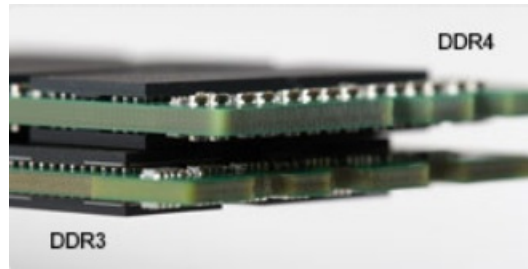Memory errors on the system display the new ON-FLASH-FLASH or ON-FLASH-ON failure code. If all memory fails, the LCD does not turn on. Troubleshoot for possible memory failure by trying known good memory modules in the memory connectors on the bottom of the system or under the keyboard, as in some portable systems.

USB features

Universal Serial Bus, or USB, was introduced in 1996. It dramatically simplified the connection between host computers and peripheral devices like mice, keyboards, external drivers, and printers.

Let's take a quick look on the USB evolution referencing to the table below.

Table 1. USB evolution

Type	Data Transfer Rate	Category	Introduction Year
USB 2.0	480 Mbps	High Speed	2000
USB 3.0/USB 3.1 Gen 1	5 Gbps	Super Speed	2010
USB 3.1 Gen 2	10 Gbps	Super Speed	2013

USB 3.0/USB 3.1 Gen 1 (SuperSpeed USB)

For years, the USB 2.0 has been firmly entrenched as the de facto interface standard in the PC world with about 6 billion devices sold, and yet the need for more speed grows by ever faster computing hardware and ever greater bandwidth demands. The USB 3.0/USB 3.1 Gen 1

finally has the answer to the consumers' demands with a theoretically 10 times faster than its predecessor. In a nutshell, USB 3.1 Gen 1 features are as follows:

- Higher transfer rates (up to 5 Gbps)
- Increased maximum bus power and increased device current draw to better accommodate power-hungry devices
- New power management features
- Full-duplex data transfers and support for new transfer types
- Backward USB 2.0 compatibility
- New connectors and cable

The topics below cover some of the most commonly asked questions regarding USB 3.0/USB 3.1 Gen 1.


Speed

Currently, there are 3 speed modes defined by the latest USB 3.0/USB 3.1 Gen 1 specification. They are Super-Speed, Hi-Speed and Full-Speed. The new SuperSpeed mode has a transfer rate of 4.8Gbps. While the specification retains Hi-Speed, and Full-Speed USB mode, commonly known as USB 2.0 and 1.1 respectively, the slower modes still operate at 480Mbps and 12Mbps respectively and are kept to maintain backward compatibility.

USB 3.0/USB 3.1 Gen 1 achieves the much higher performance by the technical changes below:

- An additional physical bus that is added in parallel with the existing USB 2.0 bus (refer to the picture below).
- USB 2.0 previously had four wires (power, ground, and a pair for differential data); USB 3.0/USB 3.1 Gen 1 adds four more for two pairs of differential signals (receive and transmit) for a combined total of eight connections in the connectors and cabling.
- USB 3.0/USB 3.1 Gen 1 utilizes the bidirectional data interface, rather than USB 2.0's half-duplex arrangement. This gives a 10-fold increase in theoretical bandwidth.
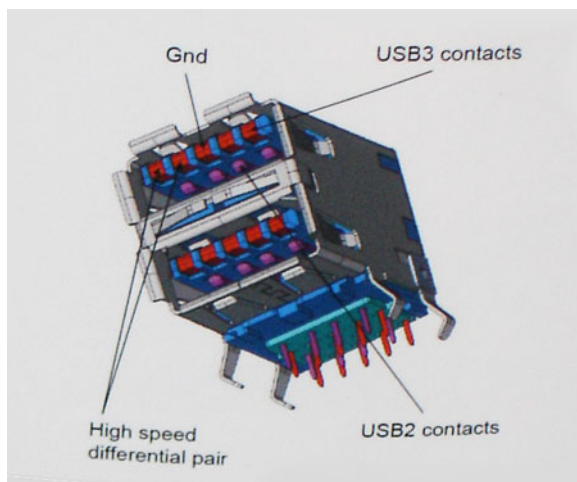
With today's ever increasing demands placed on data transfers with high-definition video content, terabyte storage devices, high megapixel count digital cameras etc., USB 2.0 may not be fast enough. Furthermore, no USB 2.0 connection could ever come close to the 480Mbps theoretical maximum throughput, making data transfer at around 320Mbps (40MB/s) — the actual real-world maximum. Similarly, USB 3.0/USB 3.1 Gen 1 connections will never achieve 4.8Gbps. We will likely see a real-world maximum rate of 400MB/s with overheads. At this speed, USB 3.0/USB 3.1 Gen 1 is a 10x improvement over USB 2.0.

Applications

USB 3.0/USB 3.1 Gen 1 opens up the laneways and provides more headroom for devices to deliver a better overall experience. Where USB video was barely tolerable previously (both from a maximum resolution, latency, and video compression perspective), it's easy to imagine that with 5-10 times the bandwidth available, USB video solutions should work that much better. Single-link DVI requires almost 2Gbps throughput. Where 480Mbps was limiting, 5Gbps is more than promising. With its promised 4.8Gbps speed, the standard will find its way into some products that previously weren't USB territory, like external RAID storage systems.

Listed below are some of the available SuperSpeed USB 3.0/USB 3.1 Gen 1 products:

- External Desktop USB 3.0/USB 3.1 Gen 1 Hard Drives
- Portable USB 3.0/USB 3.1 Gen 1 Hard Drives
- USB 3.0/USB 3.1 Gen 1 Drive Docks & Adapters
- USB 3.0/USB 3.1 Gen 1 Flash Drives & Readers
- USB 3.0/USB 3.1 Gen 1 Solid-state Drives
- USB 3.0/USB 3.1 Gen 1 RAIDs
- Optical Media Drives
- Multimedia Devices
- Networking
- USB 3.0/USB 3.1 Gen 1 Adapter Cards & Hubs

Compatibility

The good news is that USB 3.0/USB 3.1 Gen 1 has been carefully planned from the start to peacefully co-exist with USB 2.0. First of all, while USB 3.0/USB 3.1 Gen 1 specifies new physical connections and thus new cables to take advantage of the higher speed capability of the new protocol, the connector itself remains the same rectangular shape with the four USB 2.0 contacts in the exact same location as before. Five new connections to carry receive and transmitted data independently are present on USB 3.0/USB 3.1 Gen 1 cables and only come into contact when connected to a proper SuperSpeed USB connection.

Windows 8/10 will be bringing native support for USB 3.1 Gen 1 controllers. This is in contrast to previous versions of Windows, which continue to require separate drivers for USB 3.0/USB 3.1 Gen 1 controllers.

Microsoft announced that Windows 7 would have USB 3.1 Gen 1 support, perhaps not on its immediate release, but in a subsequent Service Pack or update. It is not out of the question to think that following a successful release of USB 3.0/USB 3.1 Gen 1 support in Windows 7, SuperSpeed support would trickle down to Vista. Microsoft has confirmed this by stating that most of their partners share the opinion that Vista should also support USB 3.0/USB 3.1 Gen 1.

USB Type-C

USB Type-C is a new, tiny physical connector. The connector itself can support various exciting new USB standard like USB 3.1 and USB power delivery (USB PD).

Alternate Mode

USB Type-C is a new connector standard that's very small. It's about a third the size of an old USB Type-A plug. This is a single connector standard that every device should be able to use. USB Type-C ports can support a variety of different protocols using "alternate modes," which allows you to have adapters that can output HDMI, VGA, DisplayPort, or other types of connections from that single USB port

USB Power Delivery

The USB PD specification is also closely intertwined with USB Type-C. Currently, smartphones, tablets, and other mobile devices often use a USB connection to charge. A USB 2.0 connection provides up to 2.5 watts of power — that'll charge your phone, but that's about it. A laptop might require up to 60 watts, for example. The USB Power Delivery specification ups this power delivery to 100 watts. It's bi-directional, so a device can either send or receive power. And this power can be transferred at the same time the device is transmitting data across the connection.

This could spell the end of all those proprietary laptop charging cables, with everything charging via a standard USB connection. You could charge your laptop from one of those portable battery packs you charge your smartphones and other portable devices from today. You could plug your laptop into an external display connected to a power cable, and that external display would charge your laptop as you used it as an external display — all via the one little USB Type-C connection. To use this, the device and the cable have to support USB Power Delivery. Just having a USB Type-C connection doesn't necessarily mean they do.

USB Type-C and USB 3.1

USB 3.1 is a new USB standard. USB 3's theoretical bandwidth is 5 Gbps, while USB 3.1 Gen2 is10Gbps . That's double the bandwidth, as fast as a first-generation Thunderbolt connector. USB Type-C isn't the same thing as USB 3.1. USB Type-C is just a connector shape, and the underlying technology could just be USB 2 or USB 3.0. In fact, Nokia's N1 Android tablet uses a USB Type-C connector, but underneath it's all USB 2.0 — not even USB 3.0. However, these technologies are closely related.

Intel Optane memory

Intel Optane memory functions only as a storage accelerator. It neither replaces nor adds to the memory (RAM) installed on your computer.

> (i) NOTE: Intel Optane memory is supported on computers that meet the following requirements:

- 7th Generation or higher Intel Core i3/i5/i7 processor
- Windows 10 64-bit version or higher
- Intel Rapid Storage Technology driver version 15.9.1.1018 or higher

Table 2. Intel Optane memory specifications

Feature	Specifications
Interface	PCIe 3x2 NVMe 1.1
Connector	M.2 card slot (2230/2280)
Configurations supported	• 7th Generation or higher Intel Core i3/i5/i7 processor • Windows 10 64-bit version or higher • Intel Rapid Storage Technology driver version 15.9.1.1018 or higher
Capacity	16 GB

Disabling Intel Optane memory

> ⚠ CAUTION: After disabling Intel Optane memory, do not uninstall the driver for Intel Rapid Storage Technology as it will result in a blue screen error. The Intel Rapid Storage Technology user interface can be removed without uninstalling the driver.

> ⓘ NOTE: Disabling Intel Optane memory is required before removing the SATA storage device, accelerated by the Intel Optane memory module, from the computer.

1   On the taskbar, click the search box, and then type **"Intel Rapid Storage Technology"**.
2   Click **Intel Rapid Storage Technology**. The **Intel Rapid Storage Technology** window is displayed.
3   On the **Intel Optane memory** tab, click **Disable** to disable the Intel Optane memory.
4   Click **Yes** if you accept the warning.
    The disabling progress is displayed.
5   Click **Reboot** to complete disabling Intel Optane memory and restart your computer.

Enabling Intel Optane memory

1   On the taskbar, click the search box, and type **"Intel Rapid Storage Technology"**.
2   Click **Intel Rapid Storage Technology**.
3   On the **Status** tab, click **Enable** to enable the Intel Optane memory.
4   On the warning screen, select a compatible fast drive, and then click **Yes** to continue enabling Intel Optane memory.
5   Click **Intel Optane memory > Reboot** to enable the Intel Optane memory.

> ⓘ NOTE: Applications may take up to three subsequent launches after enablement to see the full performance benefits.

Intel UHD Graphics 620

Table 3. Intel UHD Graphics 620 specifications

Intel UHD Graphics 620	
Bus Type	Integrated
Memory Type	DDR3 / DDR4
Graphics Level	i3/i5/i7: G T2 (UHD 620)
Estimated Maximum Power Consumption (TDP)	15 W (included in the CPU power)
Overlay Planes	Yes
Operating Systems Graphics/ Video API Support	DirectX 11 (Windows 7/8.1), DirectX 12 (Windows 10), OpenGL 4.3
Maximum Vertical Refresh Rate	Up to 85 Hz depending on resolution
Multiple Display Support	On System: eDP (internal), HDMI
	Via Optional Type-C Port: VGA, DisplayPort, DVI
External Connectors	HDMI 1.4b
	Type C port

Nvidia GeForce MX130 equivalent

Table 4. Nvidia GeForce MX130 specifications

Feature	Specifications
Graphics memory	2 GB GDDR5
Bus type	PCI Express 3.0
Memory Interface	GDDR5
Clock Speeds	1122 - 1242 (Boost) MHz
Maximum Color Depth	N/A
Maximum Vertical Refresh Rate	N/A
Operating Systems Graphics/ Video API Support	Windows 10/ DX 12/ OGL4.5
Supported Resolutions and Max Refresh Rates (Hz)	N/A
Numbers of Display Support	No display output from MX130

Removing and installing components

Recommended tools

The procedures in this document may require the following tools:

*   Phillips #00 and #01 screwdriver
*   Plastic scribe

Screw list

The following table provides the list of screws that are used for securing different components.

Table 5. Screw list

Component	Screw type	Quantity	Screw image
Base cover	(M2x7)	6	
Battery	M2x3	3	
Fan	M2x3	2	
Hard-drive assembly	M2x3	4	
I/O board	M2x3	2	
Power-adapter port	M2x3	1	
Power button with fingerprint reader (optional)	M2x3	2	
Solid-state drive/Intel Optane memory module	M2x3	1	
Touchpad bracket	M2x3	4	
Touchpad	M2x2 Big Head	4	
USB Type-C bracket	M2x3	2	
WLAN card bracket	M2x3	1	
Hard-drive bracket	M3x3	4	
Hinges	M2.5x5	5	

| Component	Screw type	Quantity	Screw image
System board	M2x2 Big Head	5	

Base cover

Removing the base cover

1   Follow the procedure in Before working inside your computer.
2   To remove the base cover:
   a   Loosen the 3 captive screws that secure the base cover to the palmrest and the keyboard assembly [1].
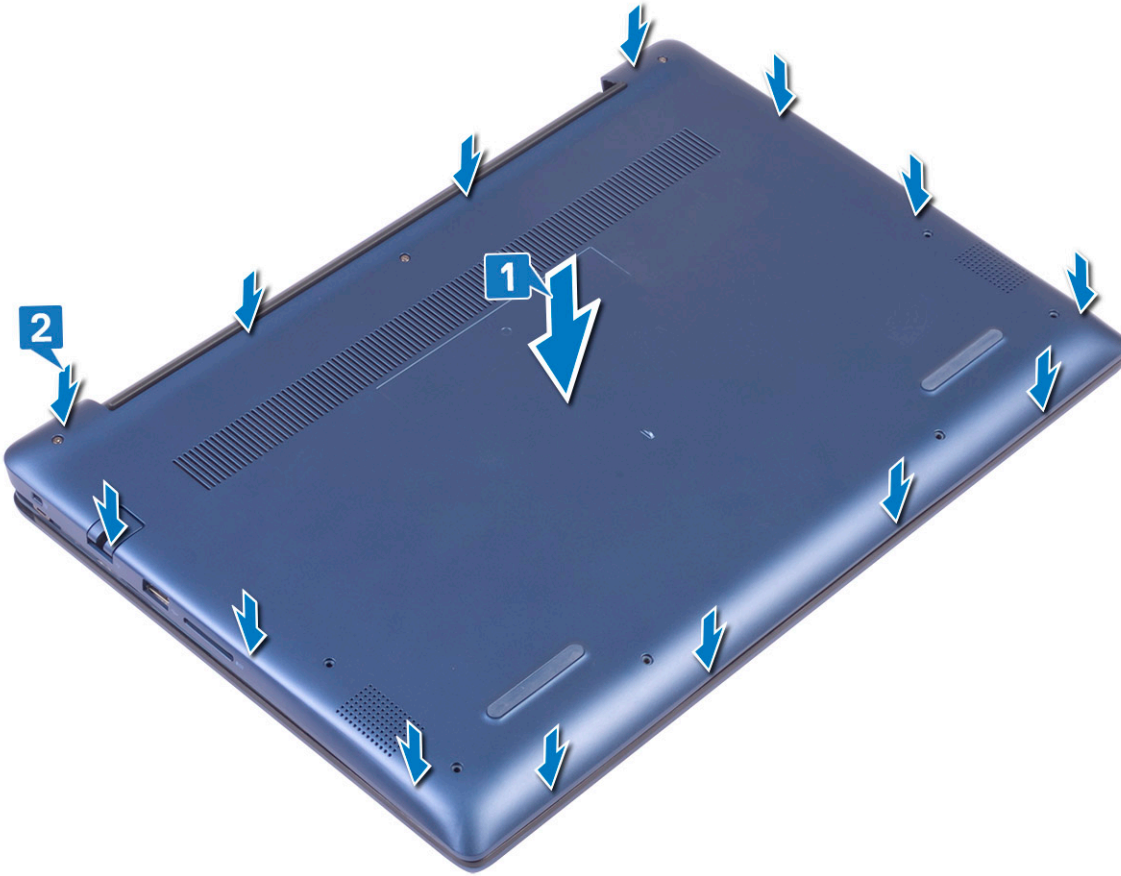   b   Remove the 6 (M2x7) screws that secure the base cover to the palmrest and the keyboard assembly [2].
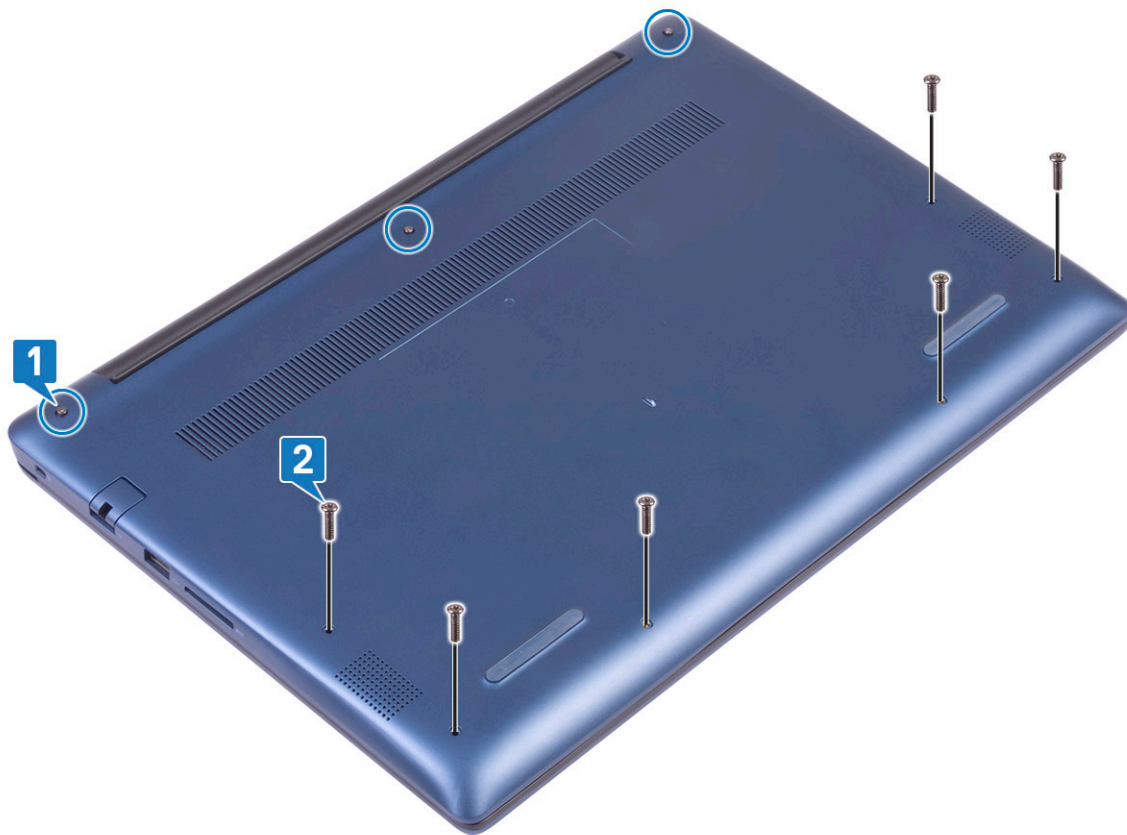
   c   Using a plastic scribe, pry the base cover starting from the top-left corner and working through the edges of the system. [1].
   d   Lift the base cover away from the system [2].
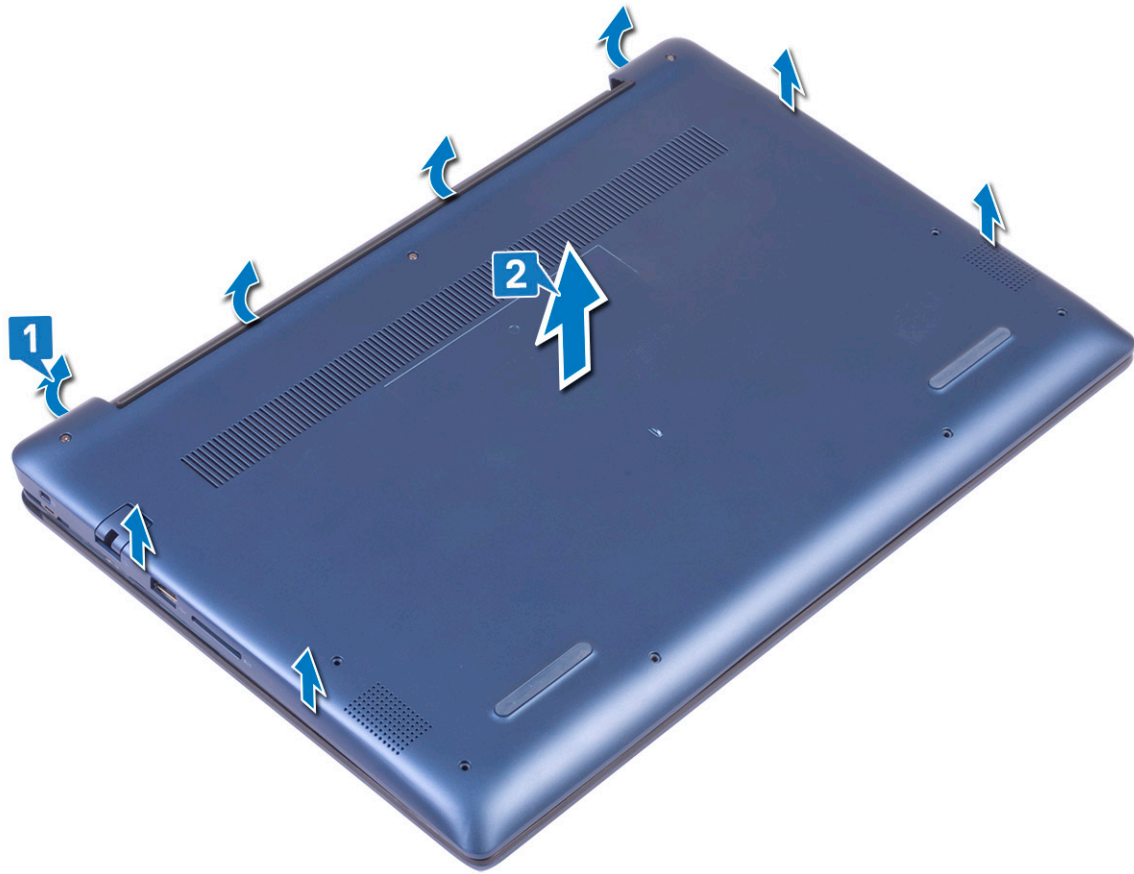
Installing the base cover

1   Align the base cover with the palmrest and the keyboard assembly.
2   Press the edges of the cover until it clicks into place.

3   Tighten the 3 captive screws to secure the base cover to the palmrest and keyboard assembly [1].

4   Replace the 6 (M2x7) screws to secure the base cover to the palmrest and keyboard assembly [2].
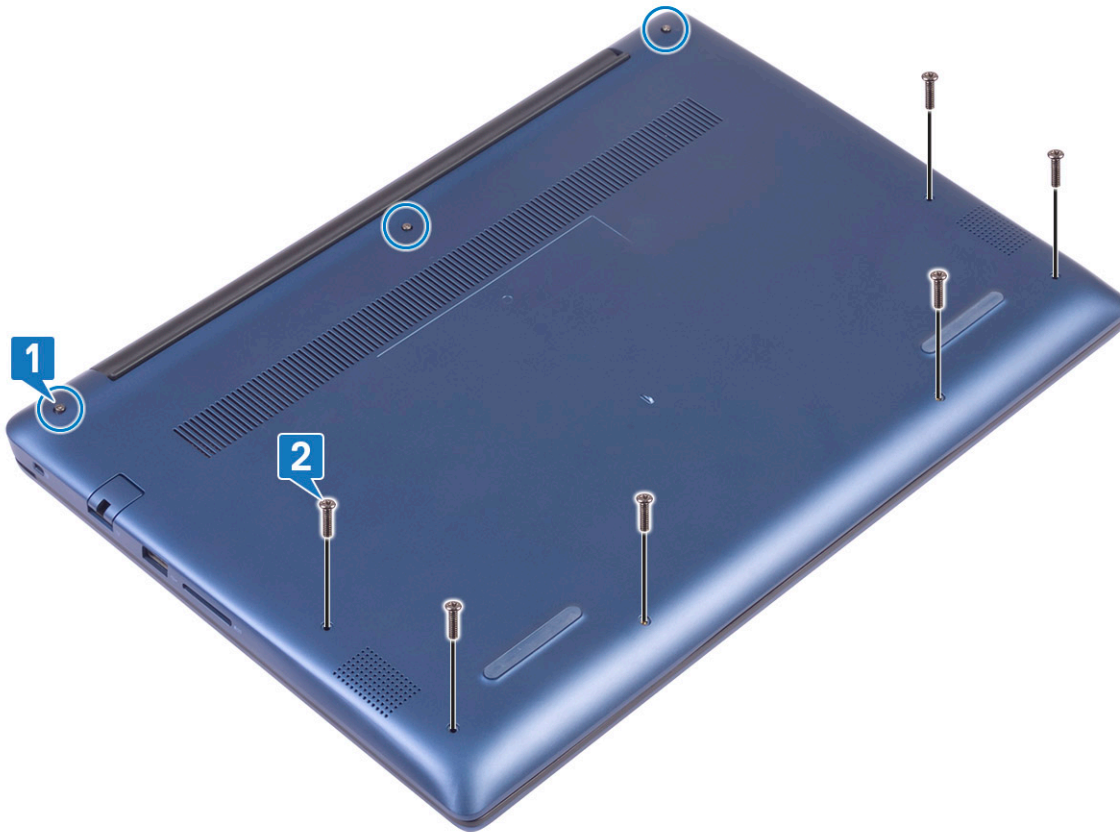
5   Follow the procedure in After working inside your computer.

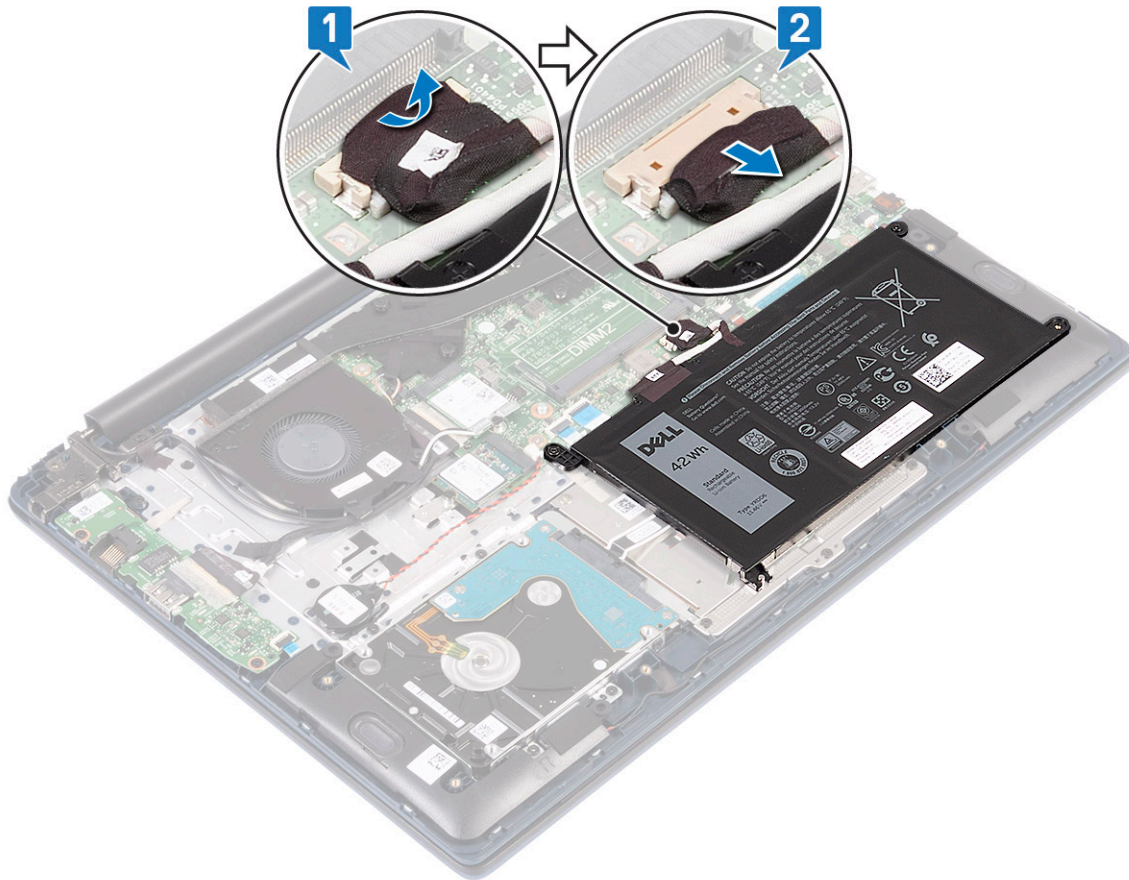# Battery

Lithium-ion battery precautions

⚠ **CAUTION:**

- Exercise caution when handling Lithium-ion batteries.
- Discharge the battery as much as possible before removing it from the system. This can be done by disconnecting the AC adapter from the system to allow the battery to drain.
- Do not crush, drop, mutilate, or penetrate the battery with foreign objects.
- Do not expose the battery to high temperatures, or disassemble battery packs and cells.
- Do not apply pressure to the surface of the battery.
- Do not bend the battery.
- Do not use tools of any kind to pry on or against the battery.
- If a battery gets stuck in a device as a result of swelling, do not try to free it as puncturing, bending, or crushing a Lithium-ion battery can be dangerous. In such an instance, the entire system should be replaced. Contact https://www.dell.com/support for assistance and further instructions.
- Always purchase genuine batteries from https://www.dell.com or authorized Dell partners and re-sellers.

Removing the battery

1   Follow the procedure in Before working inside your computer.
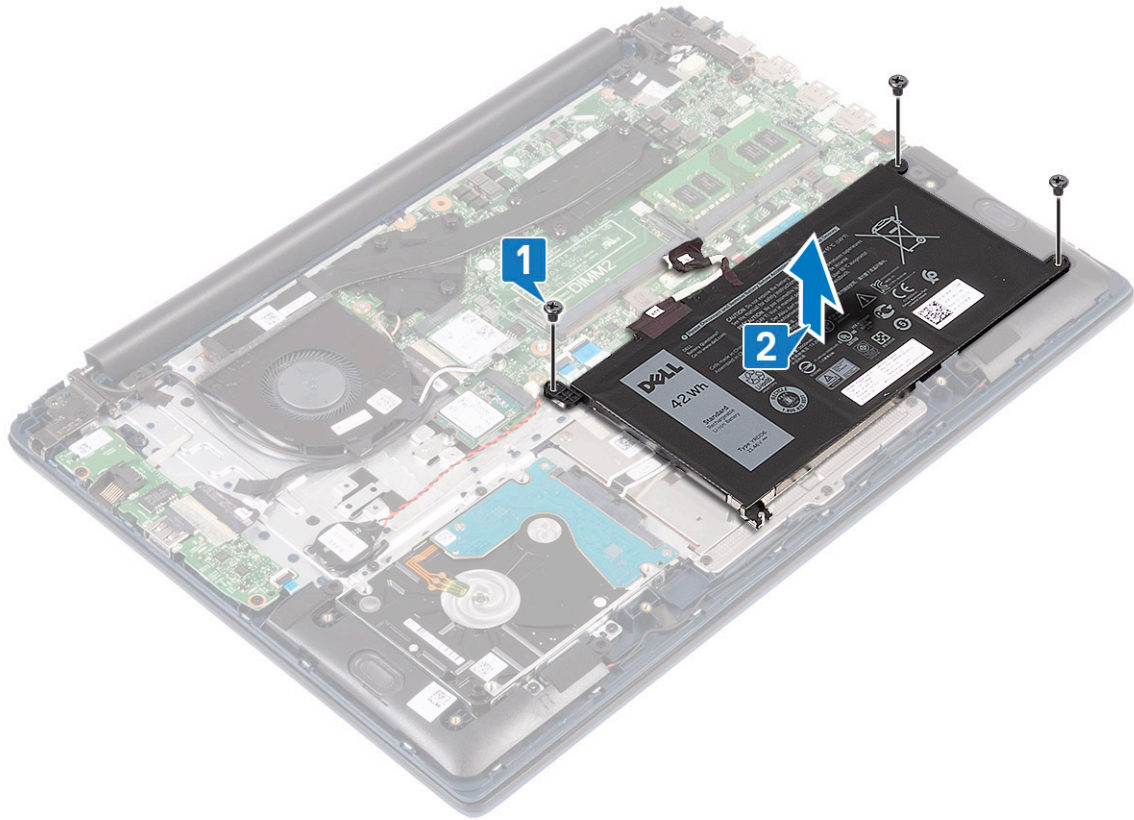2   Remove the base cover.

3 To remove the battery:

   a Peel the adhesive tape that secures the battery cable connector to the system board [1].

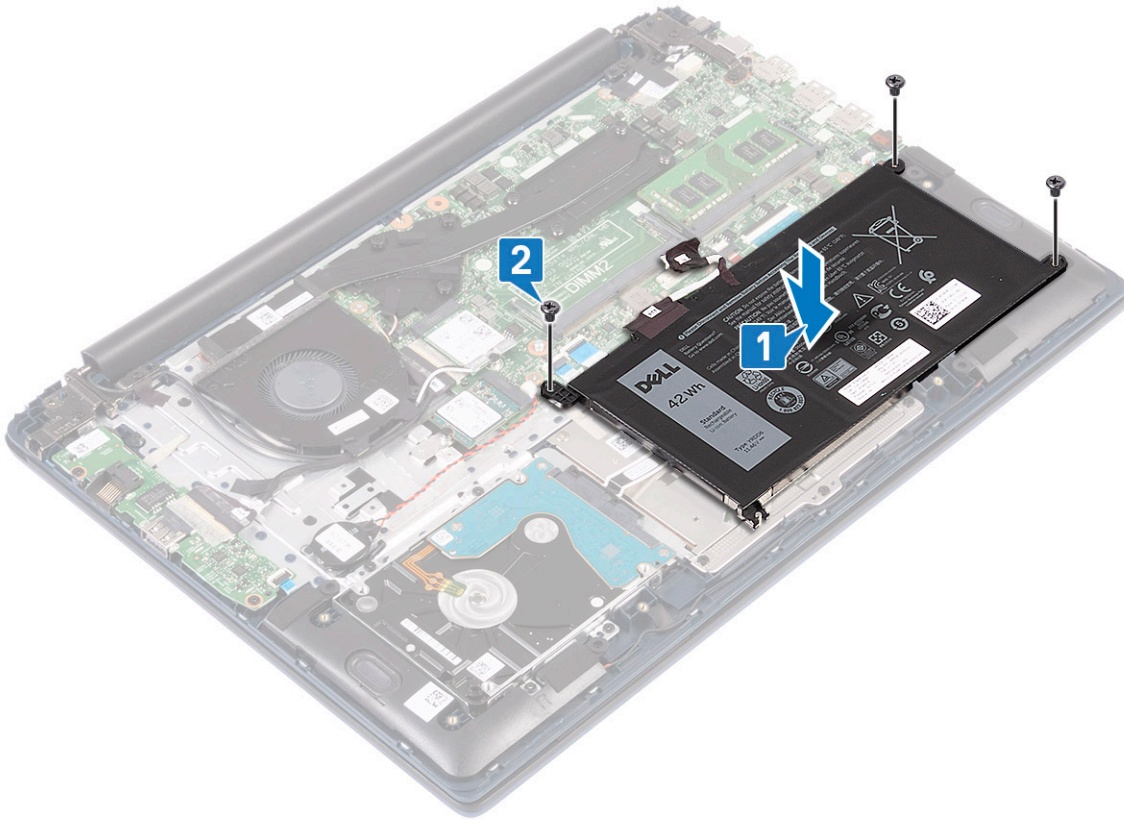   b Disconnect the battery cable from the connector on the system board [2].

   c Remove the 3 (M2x3) screws that secure the battery to the palmrest and keyboard assembly [1].

   d Lift the battery away from the system [2].

Installing the battery

1   Align the screw holes on the battery with the screw holes on the palm-rest and keyboard assembly [1].

2   Replace the 3 (M2x3) screws that secure the battery to the palm-rest and keyboard assembly [2].

3   Connect the battery cable to the connector on the system board [1].

4   Affix the adhesive tape to secure the battery cable connector to the system board [2].
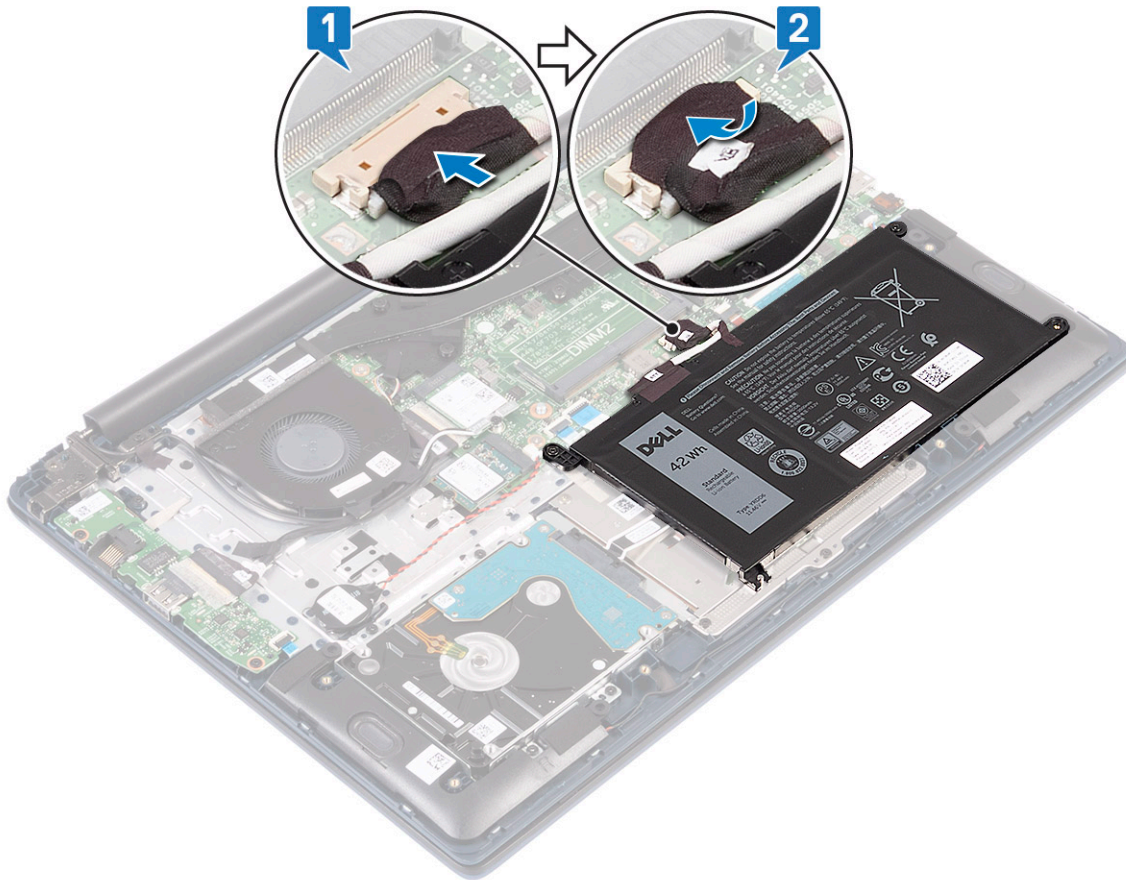
5   Install the base cover.

6   Follow the procedure in After working inside your computer.
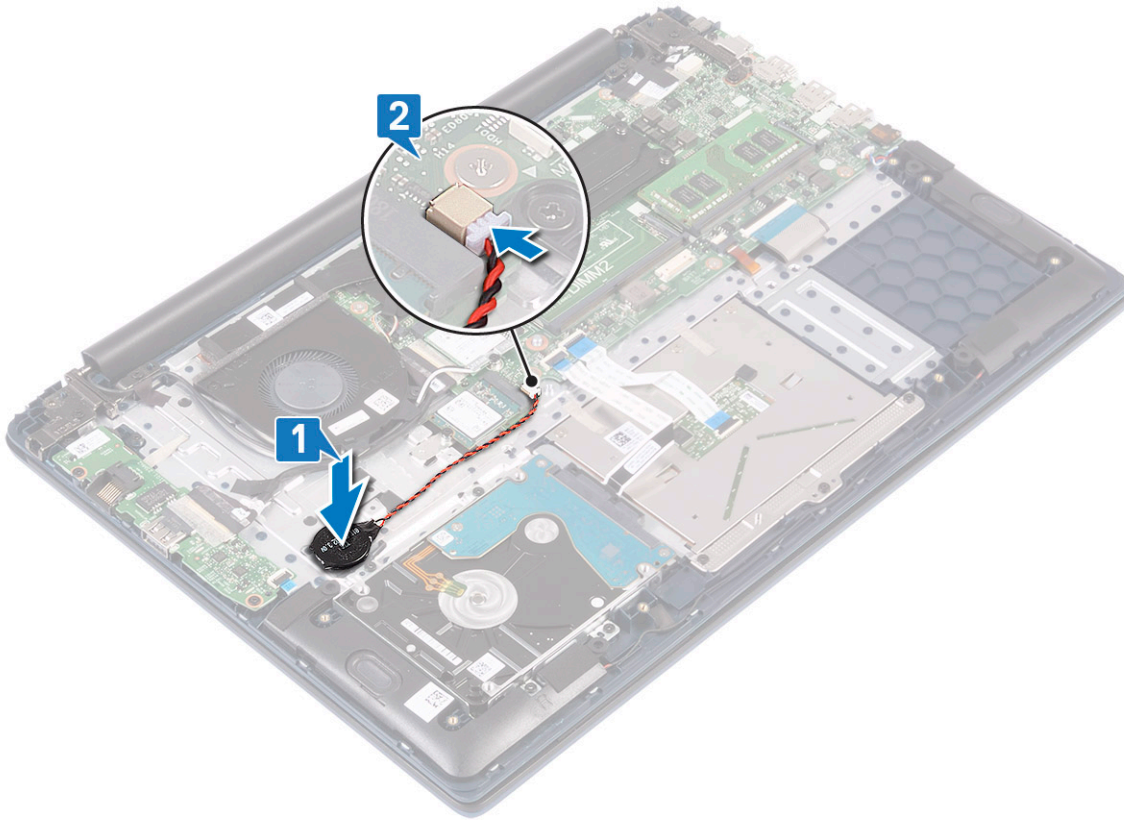
Coin-cell battery

Removing the coin cell battery

1   Follow the procedure in Before working inside your computer.

2   Remove the:
   a   base cover
   b   battery

3   To remove the coin cell battery:
   a   Disconnect the coin cell battery cable from the connector on the system board [1].
   b   Peel the coin cell battery from the system [2].
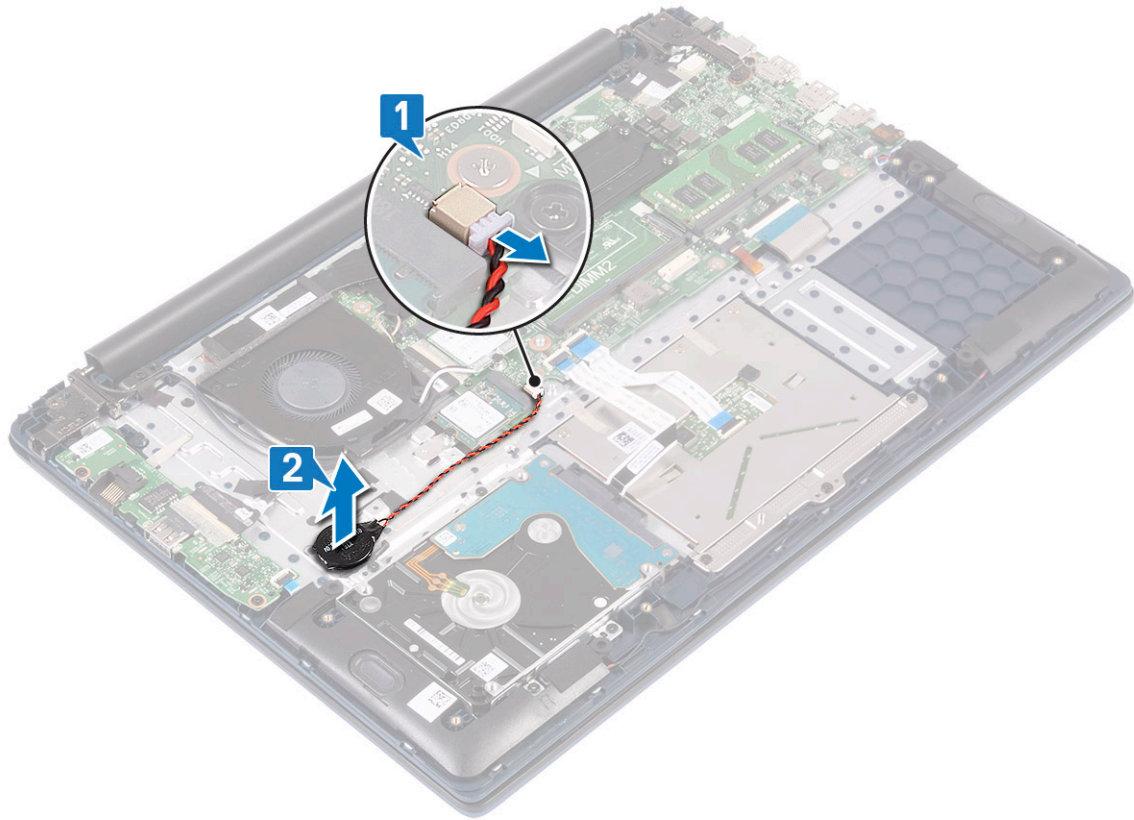
Installing the coin cell battery

1. Affix the coin cell battery to the system [1].
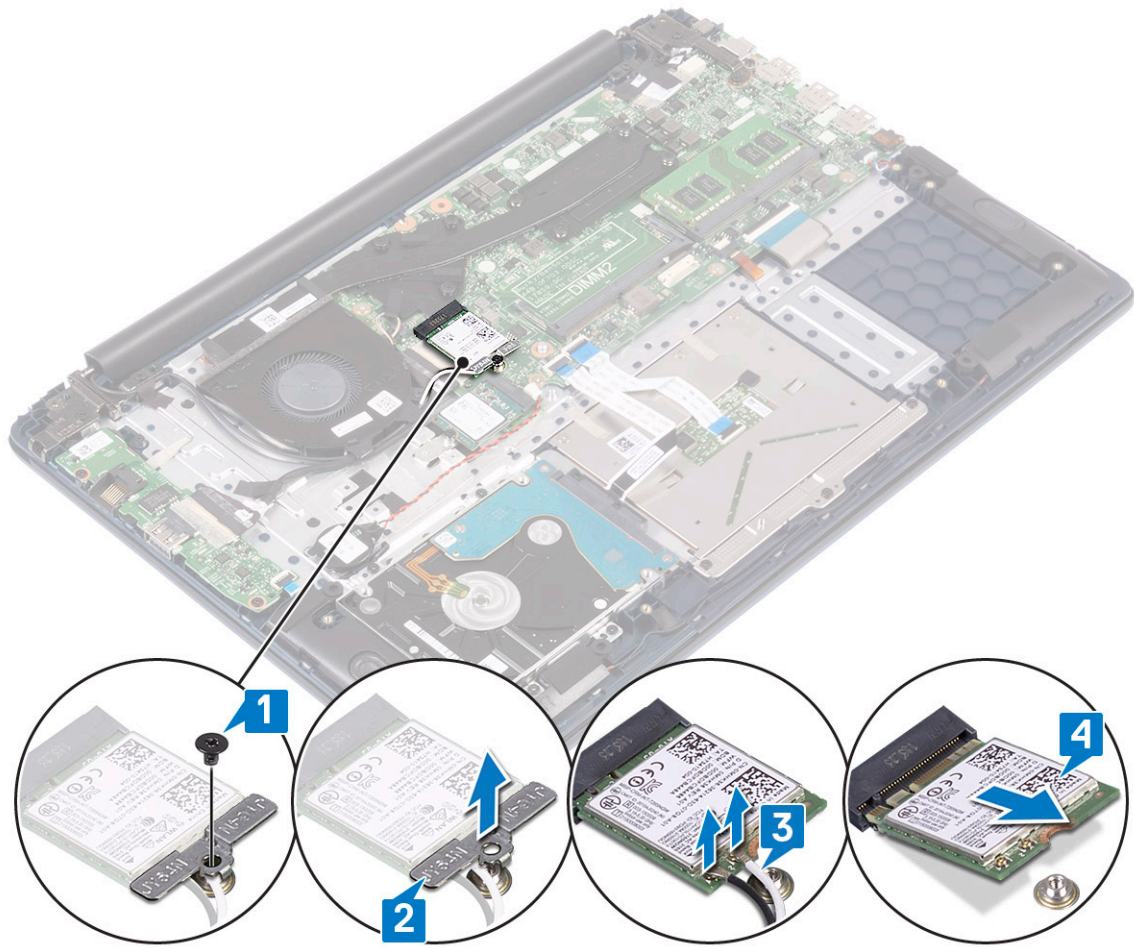2. Connect the coin cell battery cable to the connector on the system board [2].

3   Install the:
  a   battery
  b   base cover
4   Follow the procedure in After working inside your computer.

WLAN card
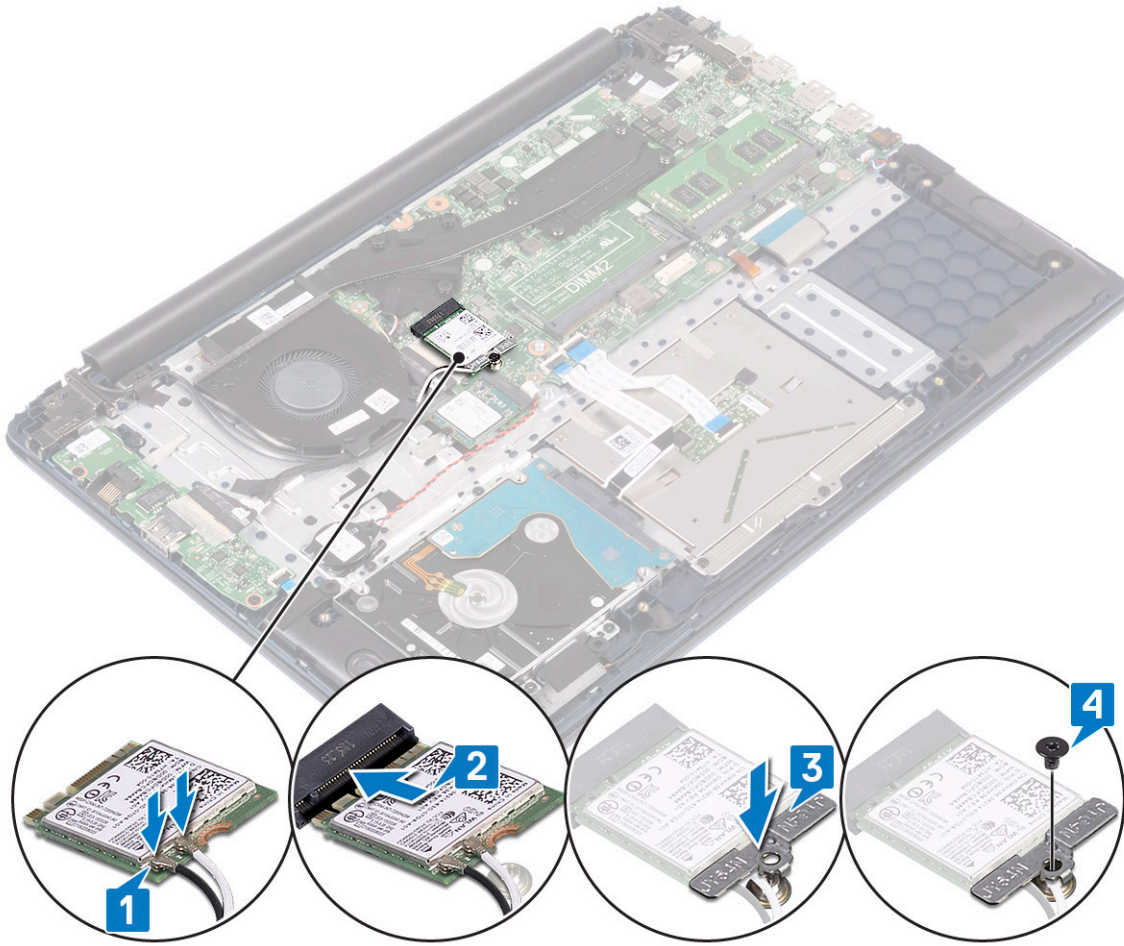
Removing the WLAN card

1   Follow the procedure in Before working inside your computer.
2   Remove the:
  a   base cover
  b   battery
3   To remove the WLAN card:
  a   Remove the single (M2x3) screw that secures the WLAN card bracket to the system board [1].
  b   Remove the WLAN card bracket away from the WLAN card [2].
  c   Disconnect the WLAN antenna cables from the connectors on the WLAN card [3].
  d   Slide and remove the WLAN card from the connector on the system board [4].

Installing the WLAN card

1   Connect the WLAN antenna cables to the connector on the WLAN card [1].
2   Slide the WLAN card at an angle into the WLAN connector on the system board [2].
3   Align the screw hole on the WLAN card bracket with the screw hole on the WLAN card and the system board [3].
4   Replace the single (M2x3) screw to secure the WLAN card bracket to the system board [4].

5   Install the:
    a   battery
    b   base cover
6   Follow the procedure in After working inside your computer.

Memory modules

Removing the memory modules

1   Follow the procedure in Before working inside your computer.
2   Remove the:
    a   base cover
    b   battery
3   To remove the memory module:
    a   Pull the clips securing the memory module until the memory module pops up [1].
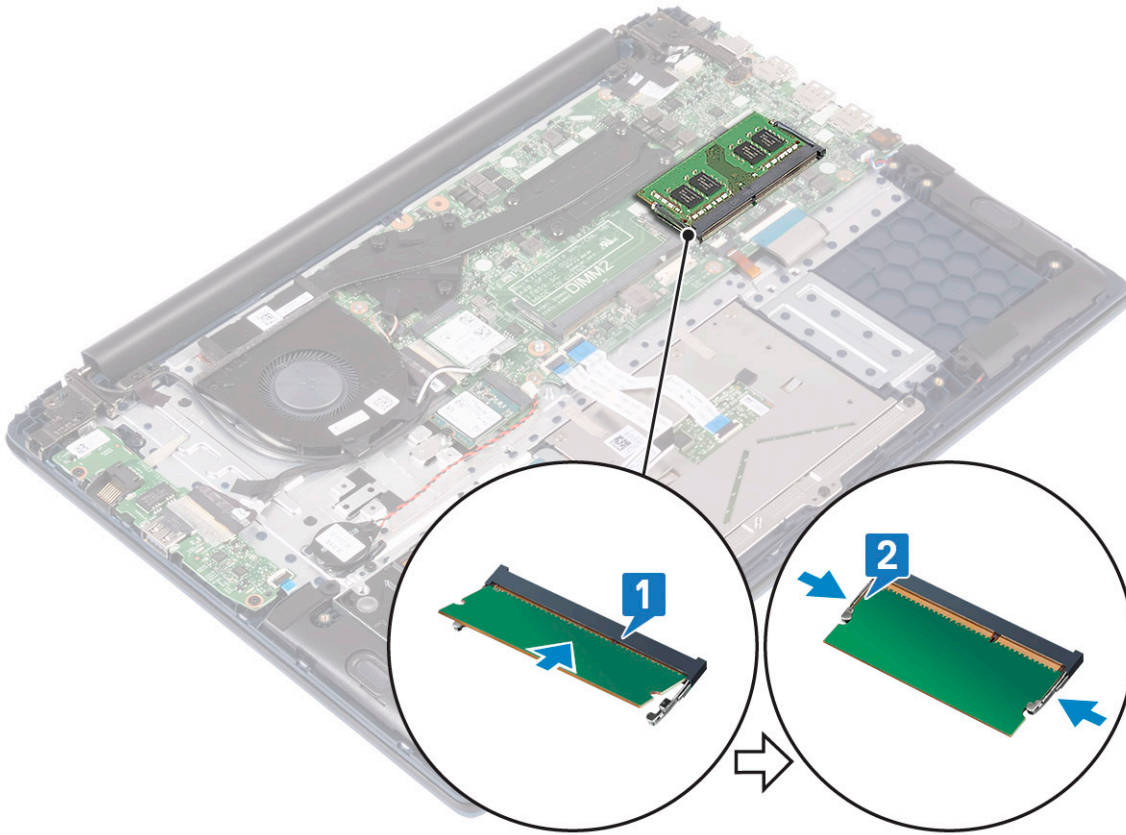   b   Remove the memory module from the connector on the system board [2].
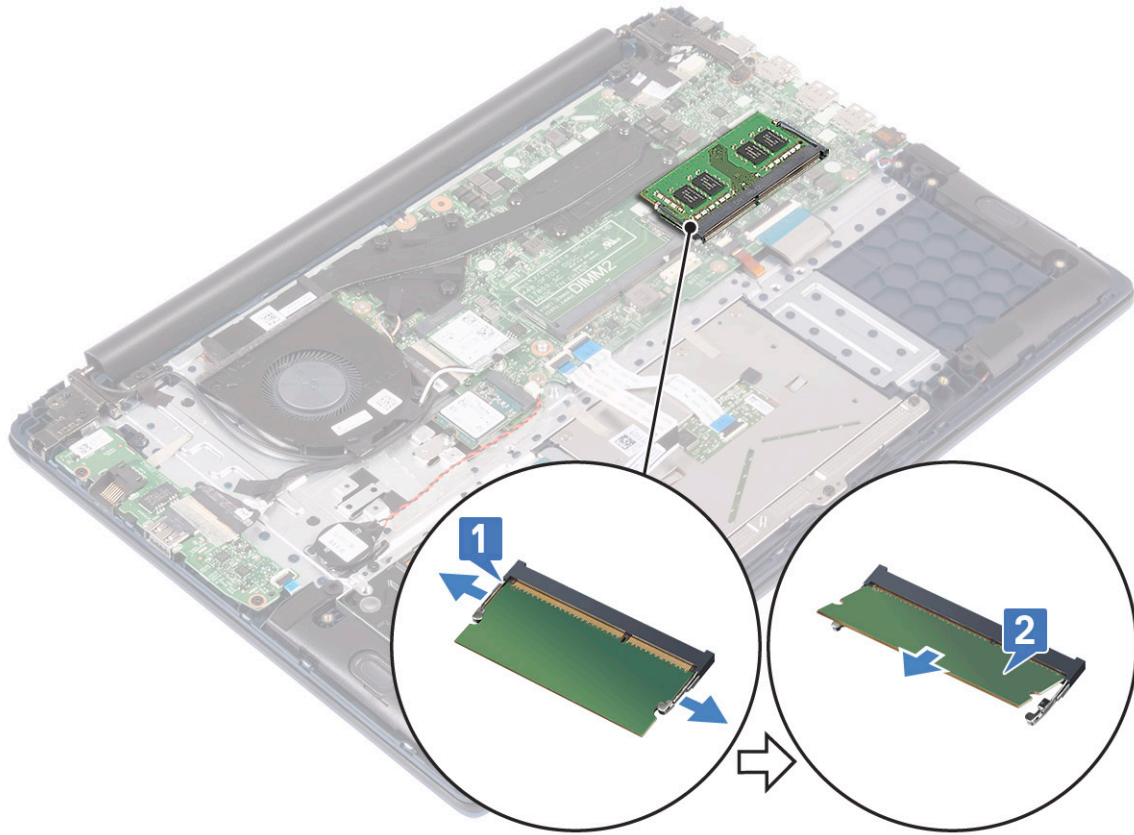
Installing the memory module

1   Align the notch on the memory module with the tab on the memory module connector.
2   Insert the memory module into the memory module socket [1].
3   Press the memory module until the memory module retention tabs click into place [2].

4   Install the:
    a   battery
    b   base cover
5   Follow the procedure in After working inside your computer.
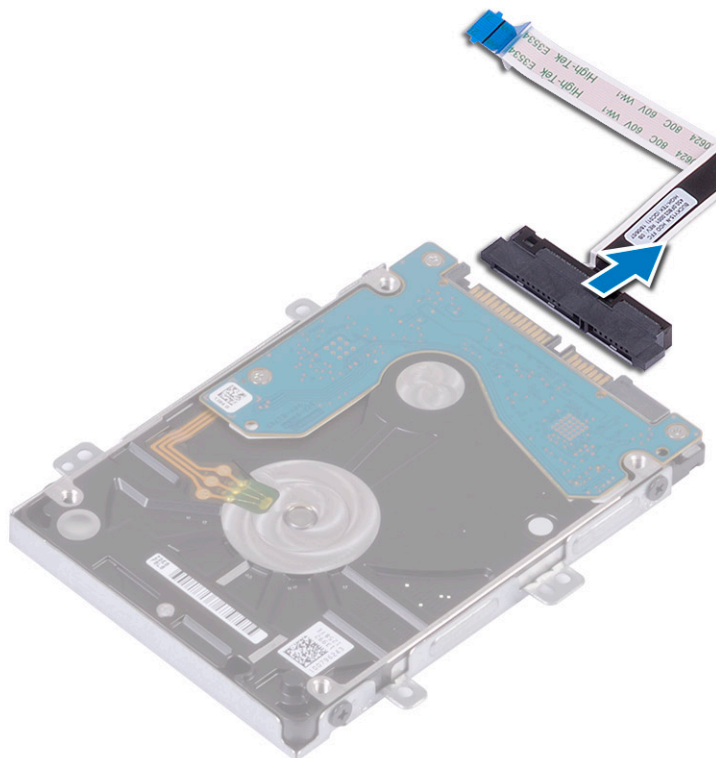
Hard drive

Removing the 2.5 inch hard drive

1   Follow the procedure in Before working inside your computer.
2   Remove the:
    a   base cover
    b   battery
3   To remove the hard drive assembly:
    a   Release the latch and disconnect the hard drive assembly cable from the connector on the system board [1].
    b   Remove the 4 (M2x3) screws that secure the hard drive assembly to the palmrest and keyboard assembly [2].
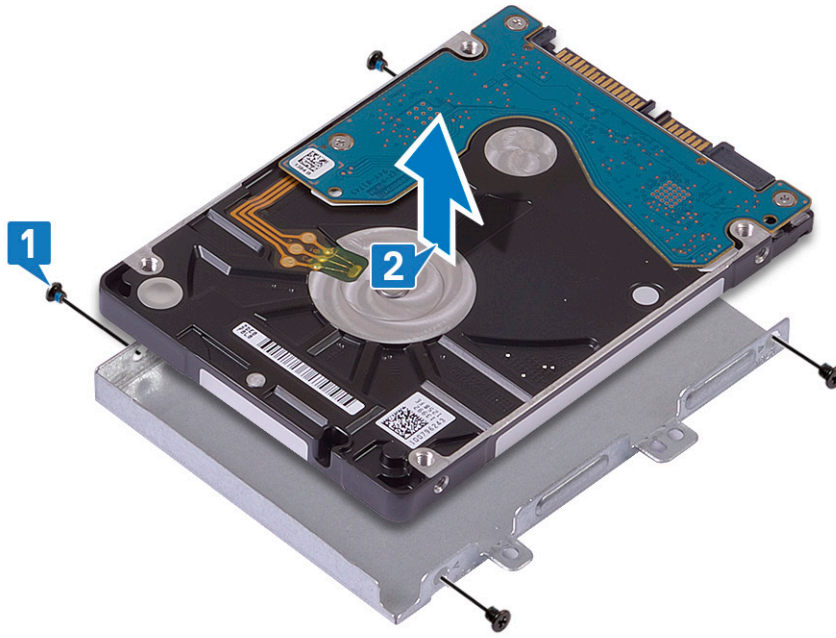   c   Lift the hard drive assembly from the system [3].
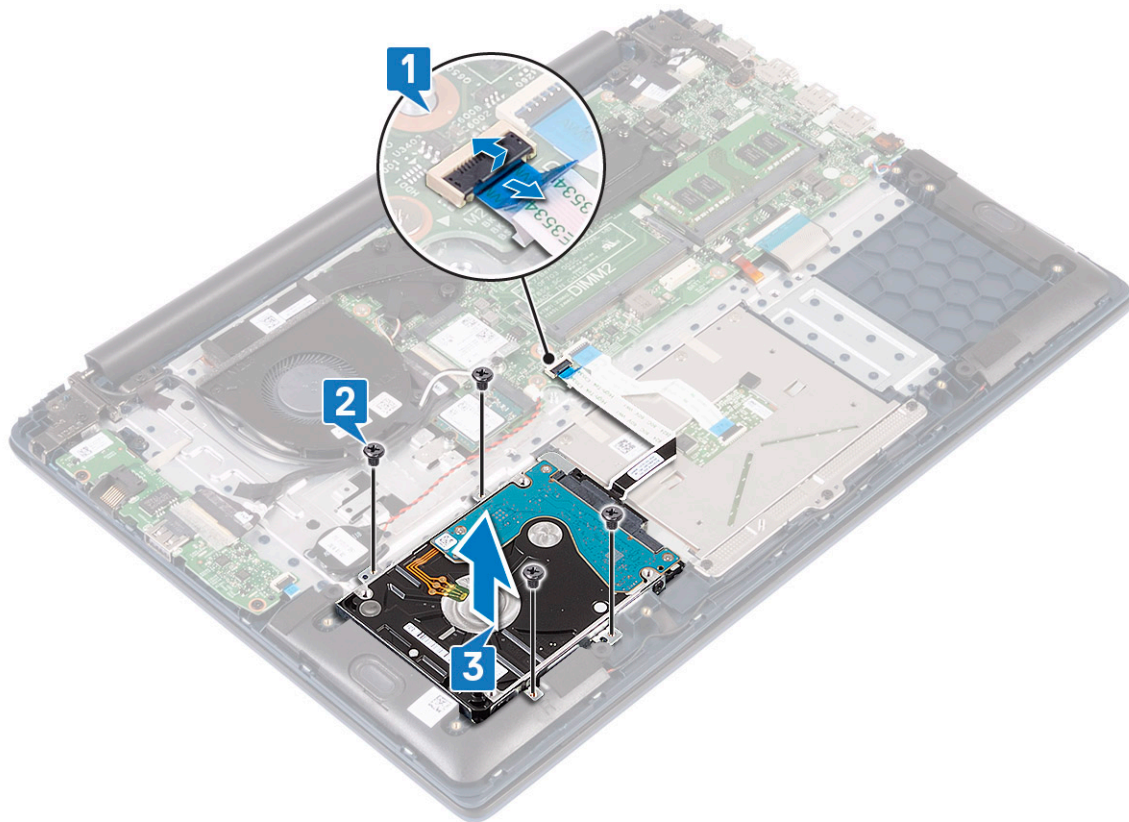
4 To remove the hard drive cable:

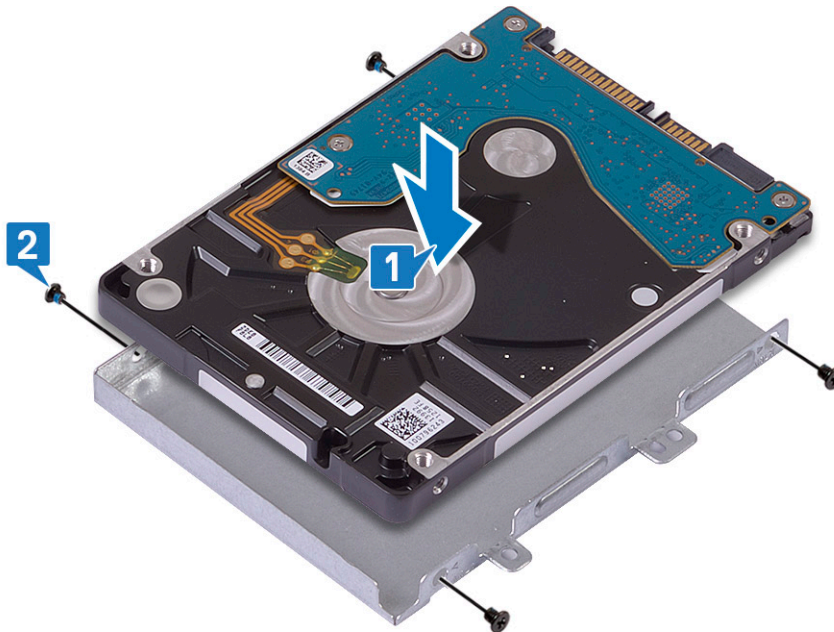   a Disconnect the interposer from the hard drive assembly.

5 To remove the hard drive bracket:

    a Remove the 4 (M3x3) screws that secure the hard drive bracket to the hard drive [1].
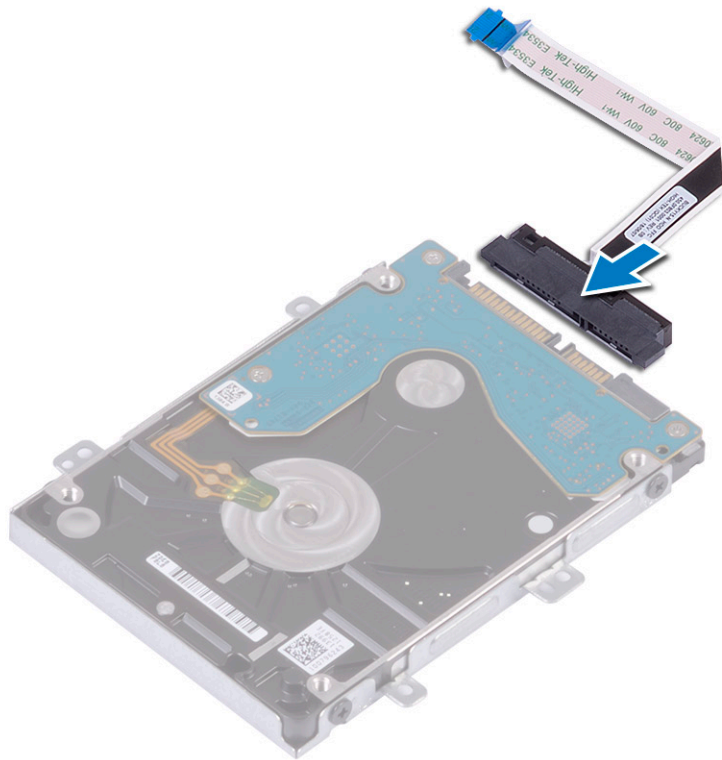
b Lift the hard drive from the hard drive bracket [2].

Installing the 2.5 inch hard drive

1 Place the hard drive in the hard drive bracket and align the screw holes on the hard-drive bracket with the screw holes on the hard drive [1].

2 Replace the 4 (M3x3) screws to secure the hard drive bracket to the hard drive [2].

3 Connect the interposer to the hard drive assembly.

4   Place the hard drive assembly on the system and align the screw holes on the hard-drive assembly with the screw holes on the palm-
    rest and keyboard assembly [1].

5   Replace the 4 (M2x3) screws to secure the hard drive assembly to the palmrest and keyboard assembly [2].

6   Connect the hard drive assembly cable to the connector on the system board and close the latch to secure the cable [3].
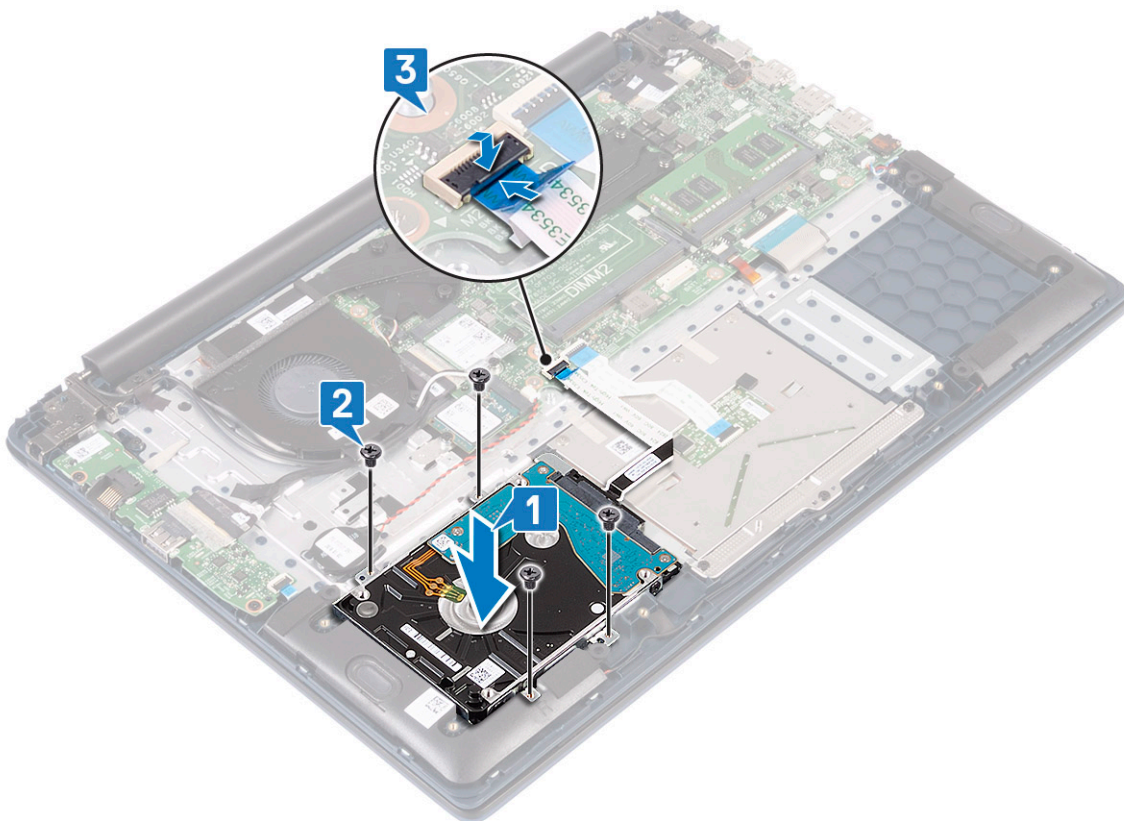
7   Install the:
       a   battery
       b   base cover
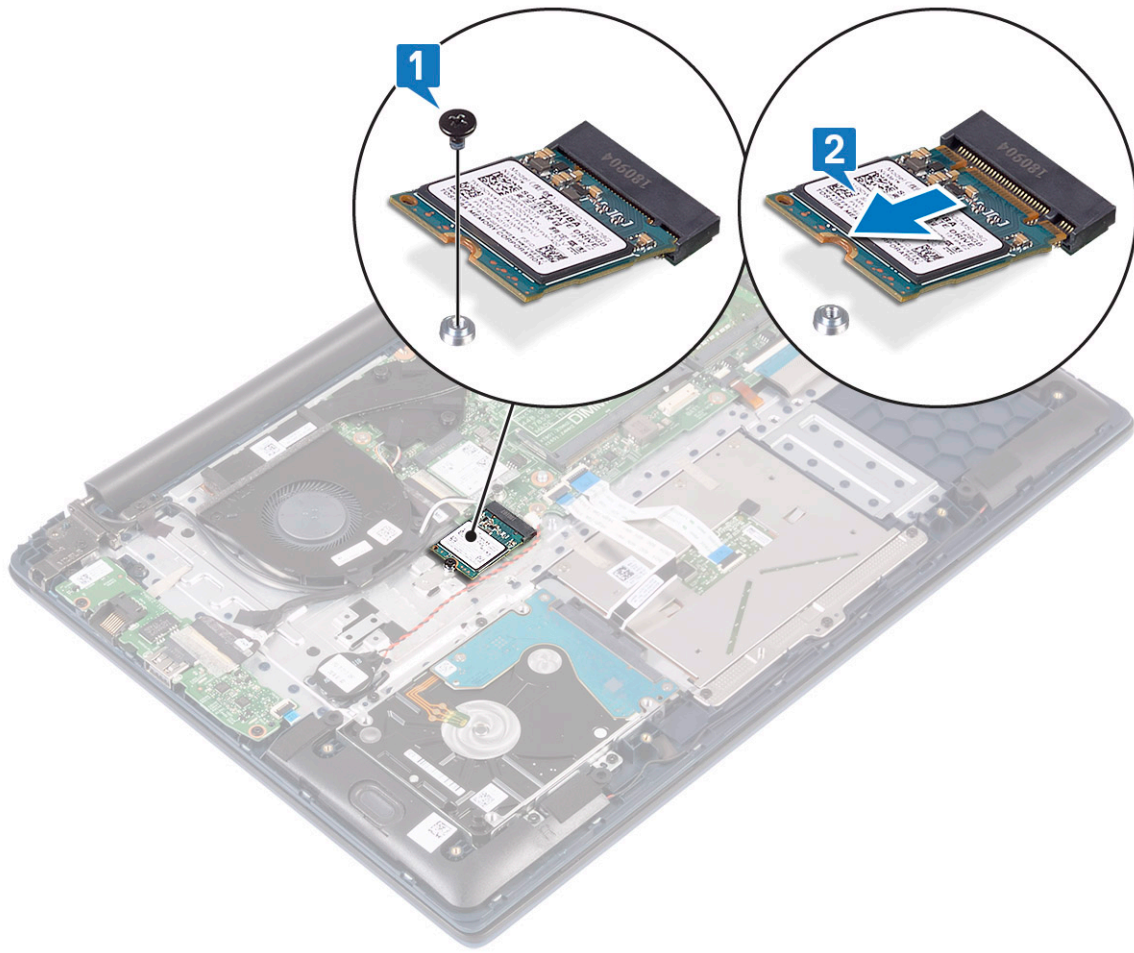8   Follow the procedure in After working inside your computer.

Solid-state drive

Removing the solid-state drive

1   Follow the procedure in Before working inside your computer.
2   Remove the:
       a   base cover
       b   battery
3   To remove the M.2 2280 SSD module:
       a   Remove the single (M2x3) screw that secures the SSD module to the palmrest and keyboard assembly [1].
       b   Slide and remove the SSD module from the connector on the system board [2].
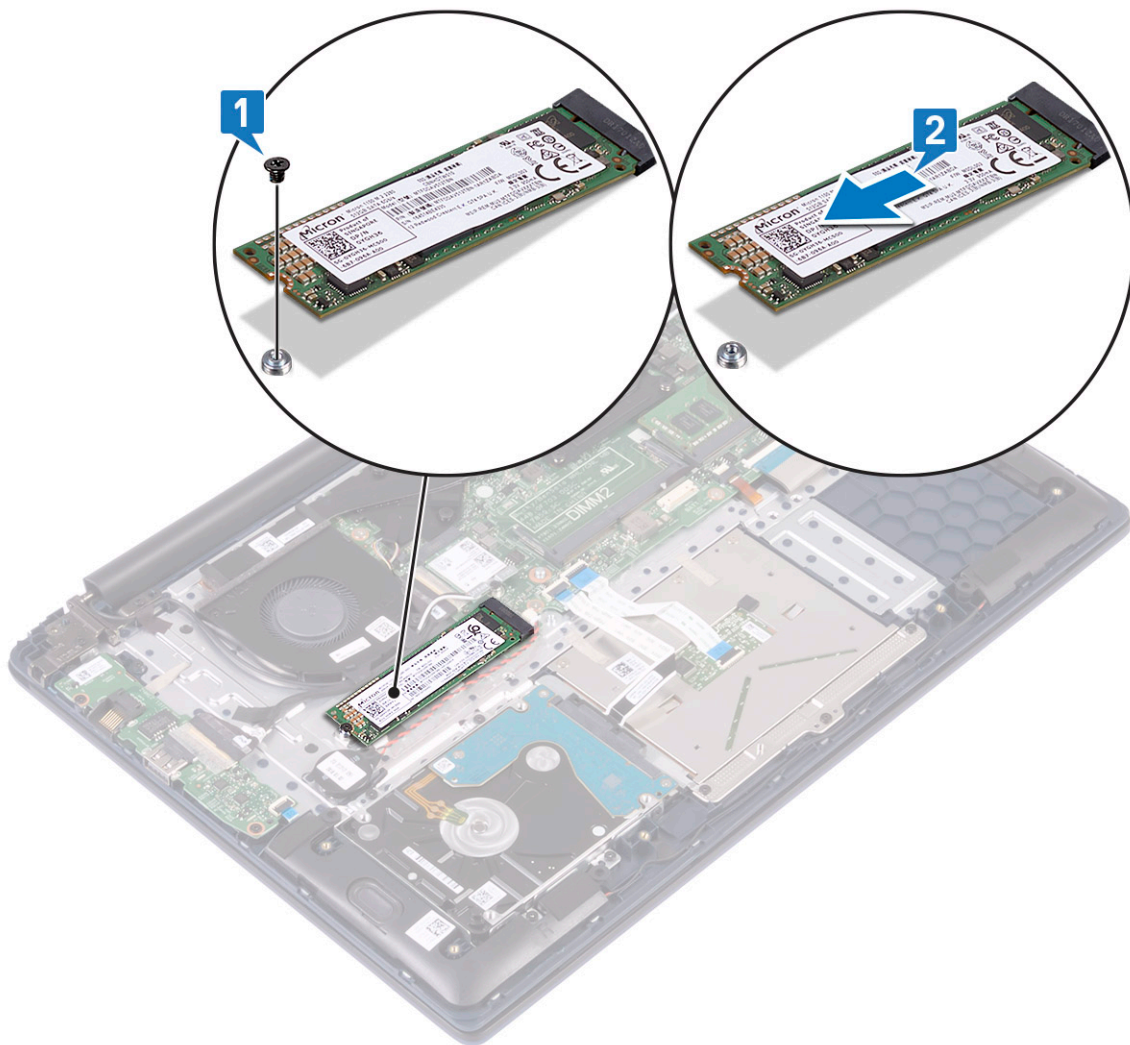
4   To remove the M.2 2230 SSD module:
       a   Remove the single (M2x3) screw that secures the SSD module to the palmrest and keyboard assembly [1].
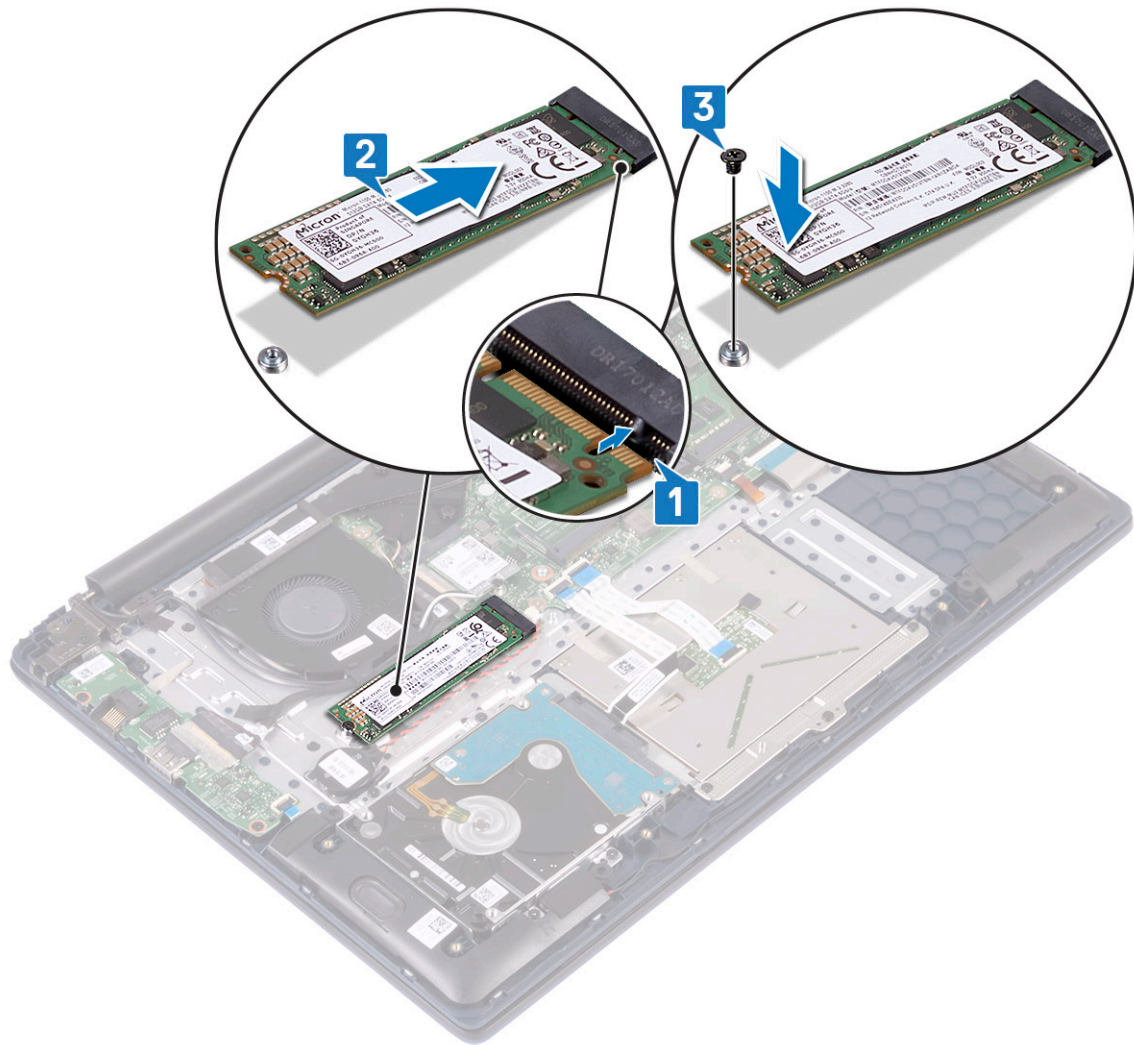   b   Slide and remove the SSD module from the connector on the system board [2].

Installing the solid-state drive

1   To install the M.2 2280 SSD module:

    a   Align and slide the SSD module to the connector on the system board [1].

    b   Replace the single (M2x3) screw to secure the SSD module to the palmrest and keyboard assembly [2].

2 To install the M.2 2230 SSD module:
   a Align and slide the SSD module to the connector on the system board [1].
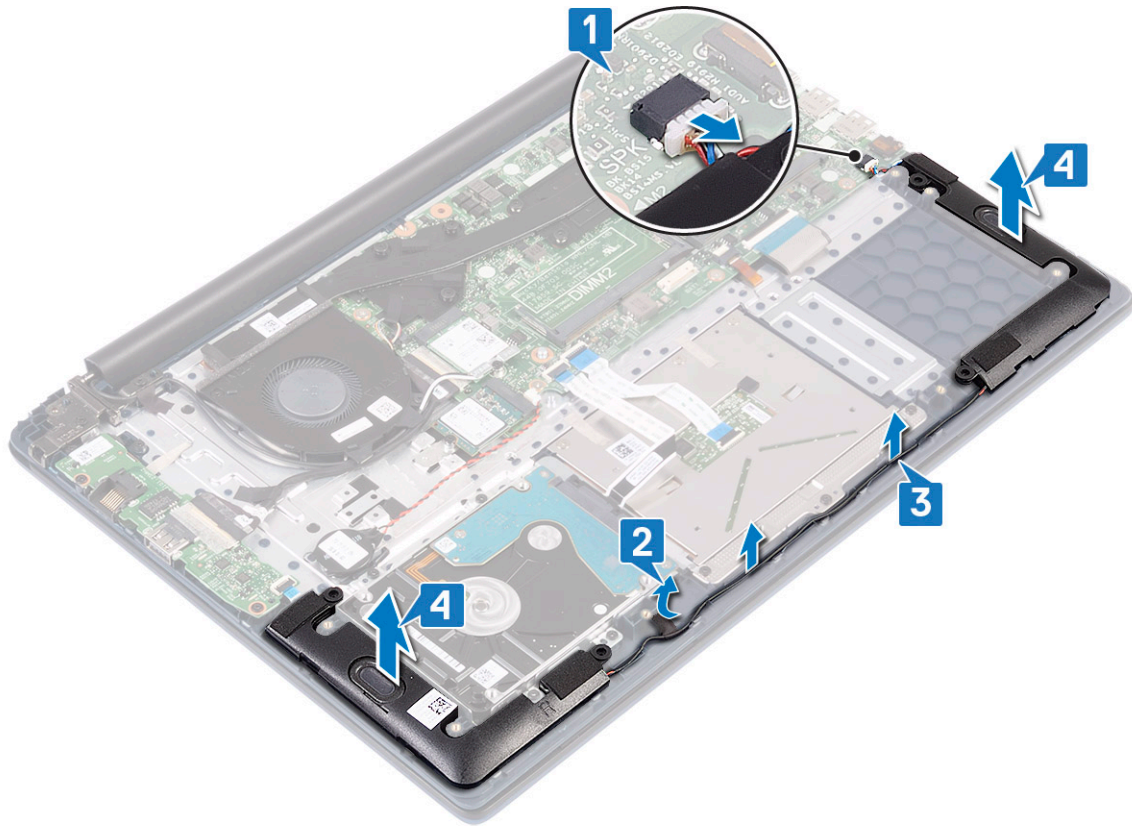   b Replace the single (M2x3) screw to secure the SSD module to the palmrest and keyboard assembly [2].
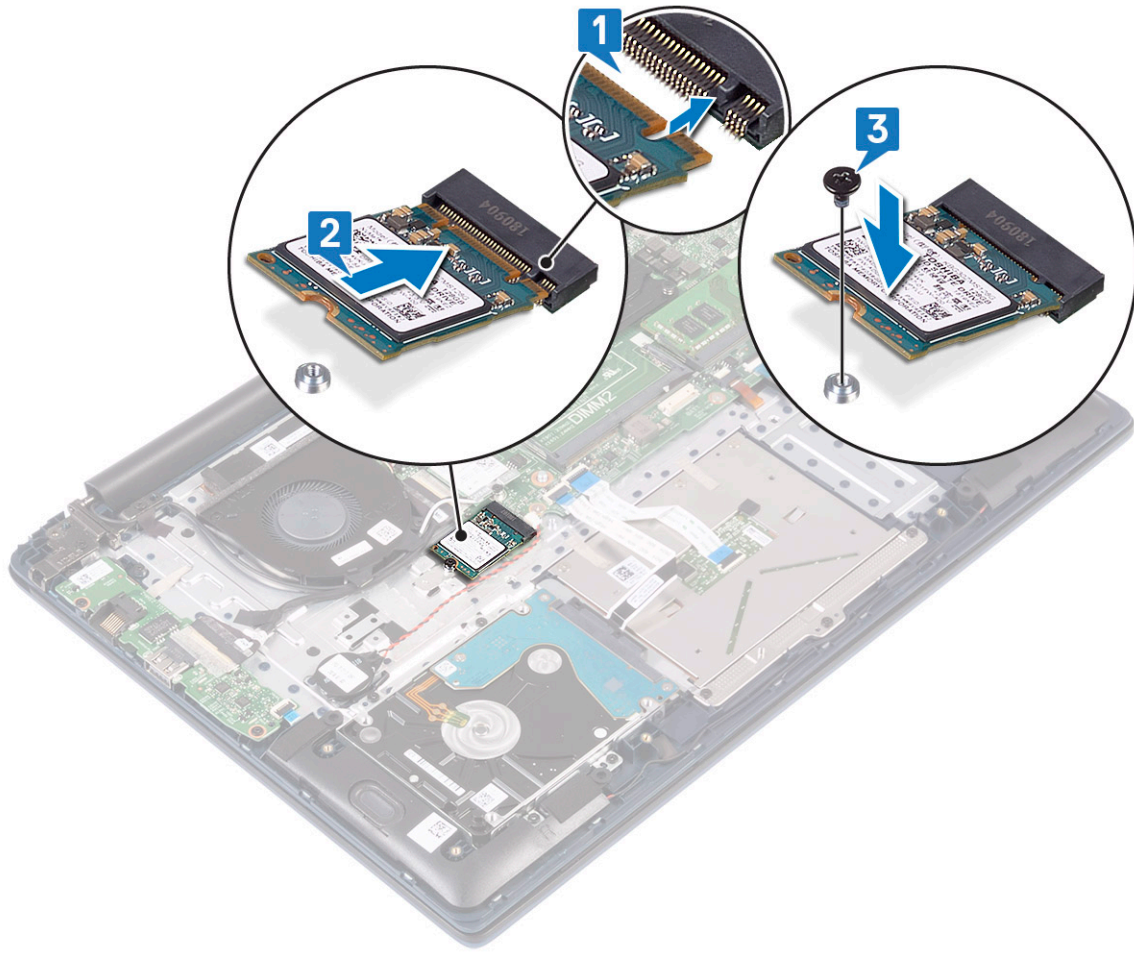
3 Install the:

    a   battery

    b   base cover

4 Follow the procedure in After working inside your computer.

Speaker

Removing the speaker
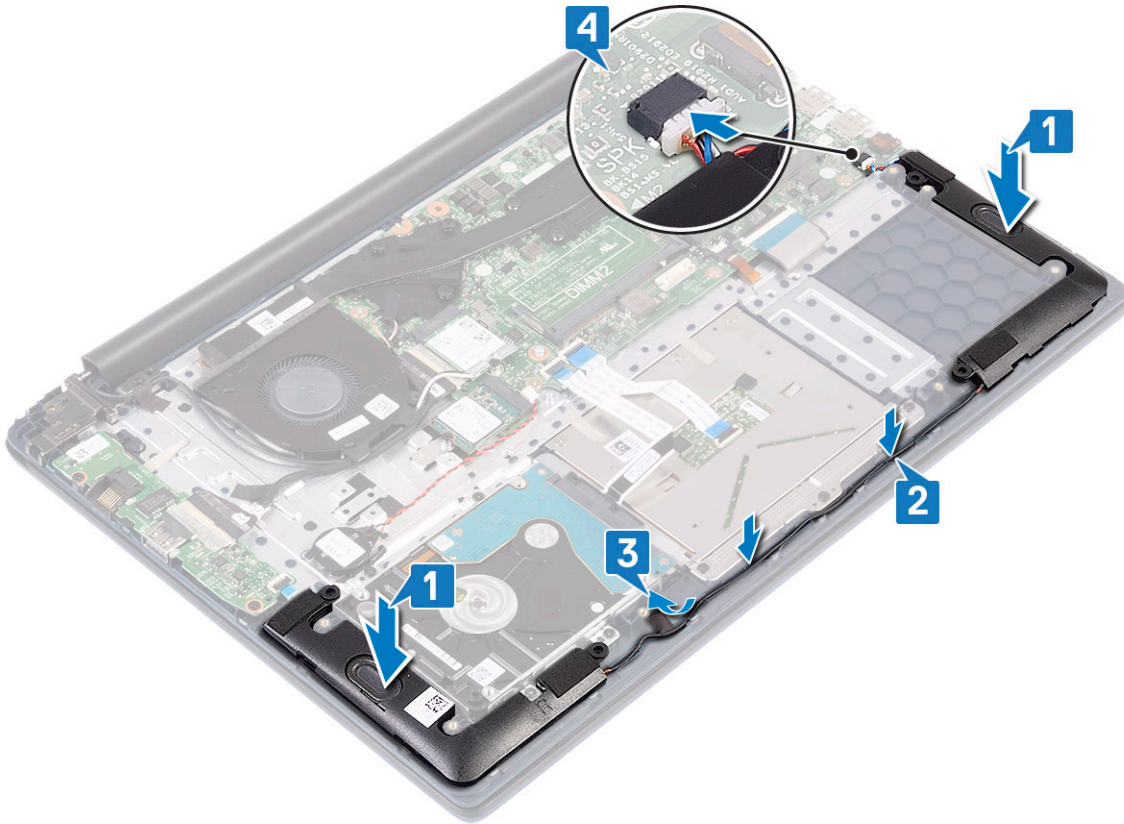
1 Follow the procedure in Before working inside your computer.

2 Remove the:

    a   base cover

    b   battery

3 To remove the speaker:

    a   Disconnect the speaker cable from the connector on the system board [1].

    b   Peel the adhesive tape that secures the speaker cable to the palmrest and keyboard assembly [2].

    c   Unroute the speaker cable from the palmrest and keyboard assembly [3].

    d   Lift the speakers from the system [4].

Installing the speaker

1. Align and place the speakers into the slot on the palmrest and keyboard assembly [1].
2. Route the speaker cable through the routing channel on the palmrest and keyboard assembly [2].
3. Affix the adhesive tape to secure the speaker cable to the palmrest and keyboard assembly
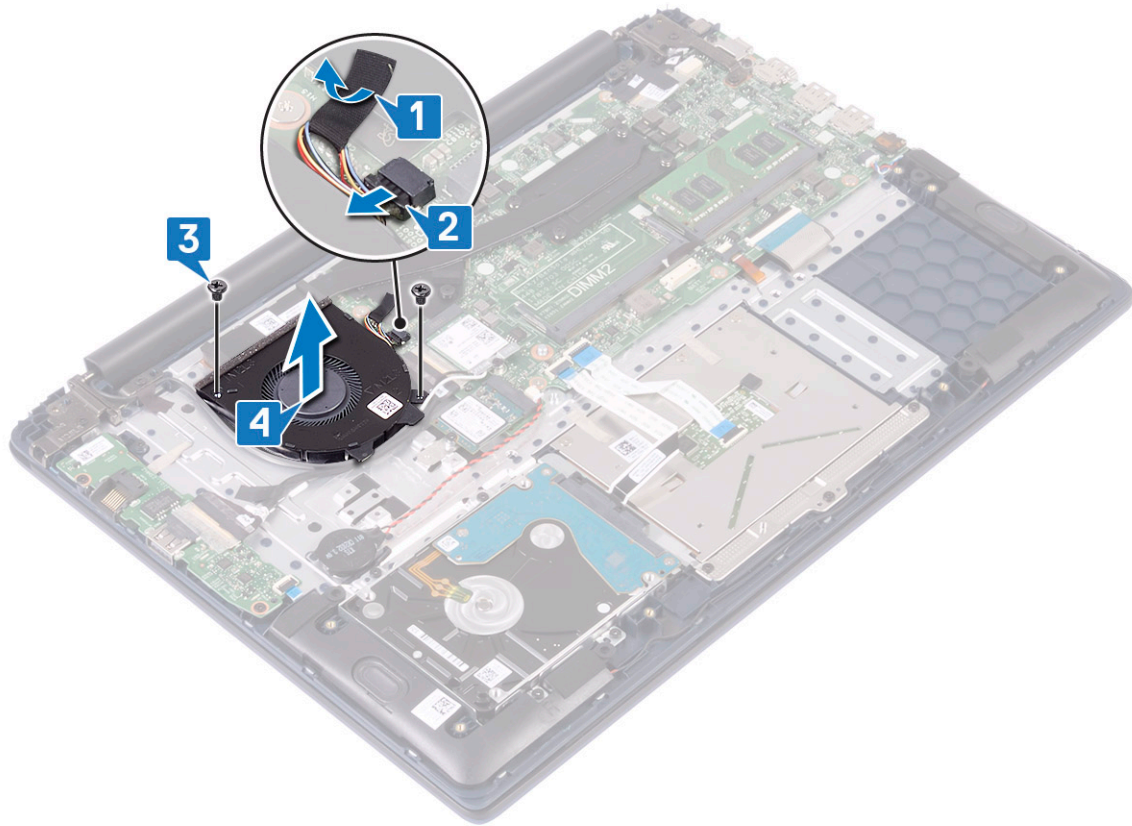4. Connect the speaker cable to the connector on the system board [4].

5 Install the:
    a   battery
    b   base cover

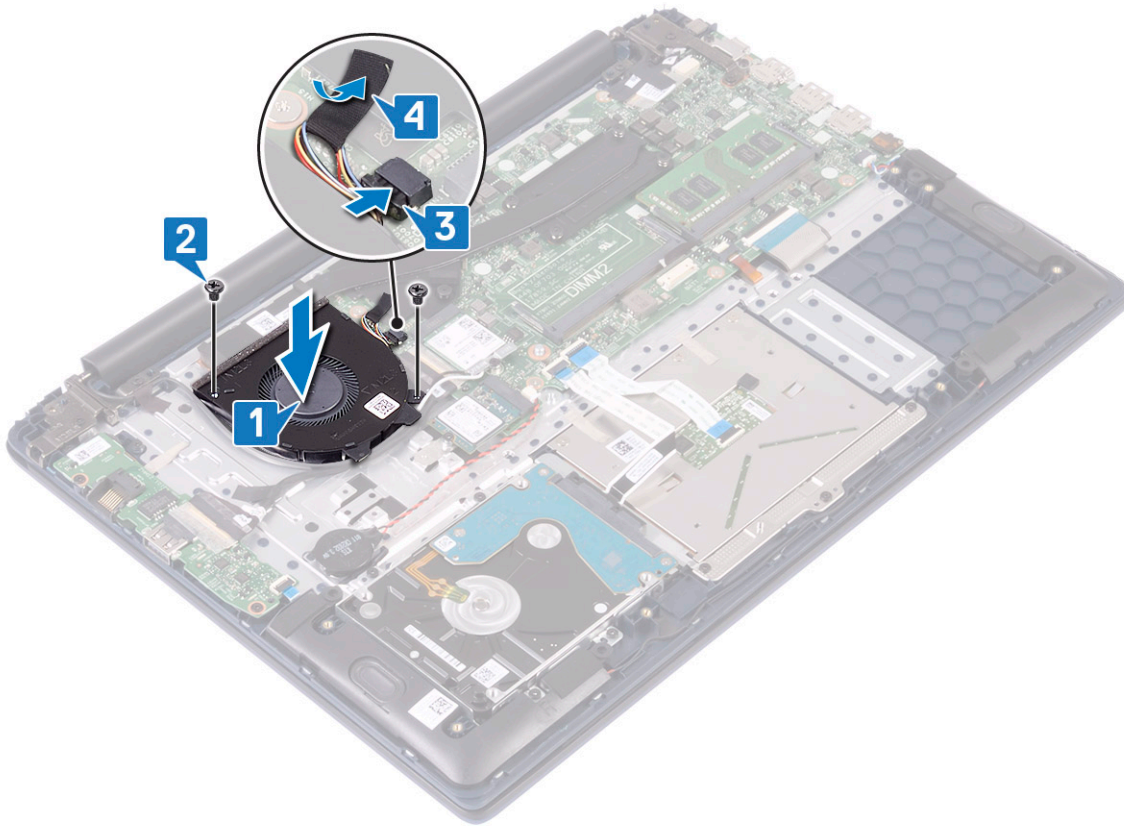6 Follow the procedure in After working inside your computer.

System fan

Removing the system fan

1 Follow the procedure in Before working inside your computer.
2 Remove the:
    a   base cover
    b   battery
3 To remove the system fan:
    a   Peel the adhesive tape that secures the system fan cable to the heatsink [1].
    b   Disconnect the system fan cable from the connector on the system board [2].
    c   Remove the two (M2x3) screws that secure the system fan to the palmrest and keyboard assembly [3].
    d   Lift the system fan away from the system [4].

Installing the system fan

1   Align and place the system fan to the slot on the palmrest and keyboard assembly [1].
2   Replace the 2 (M2x3) screws to secure the system fan to the palmrest and keyboard assembly [2].
3   Connect the system fan cable to the connector on the system board [3].
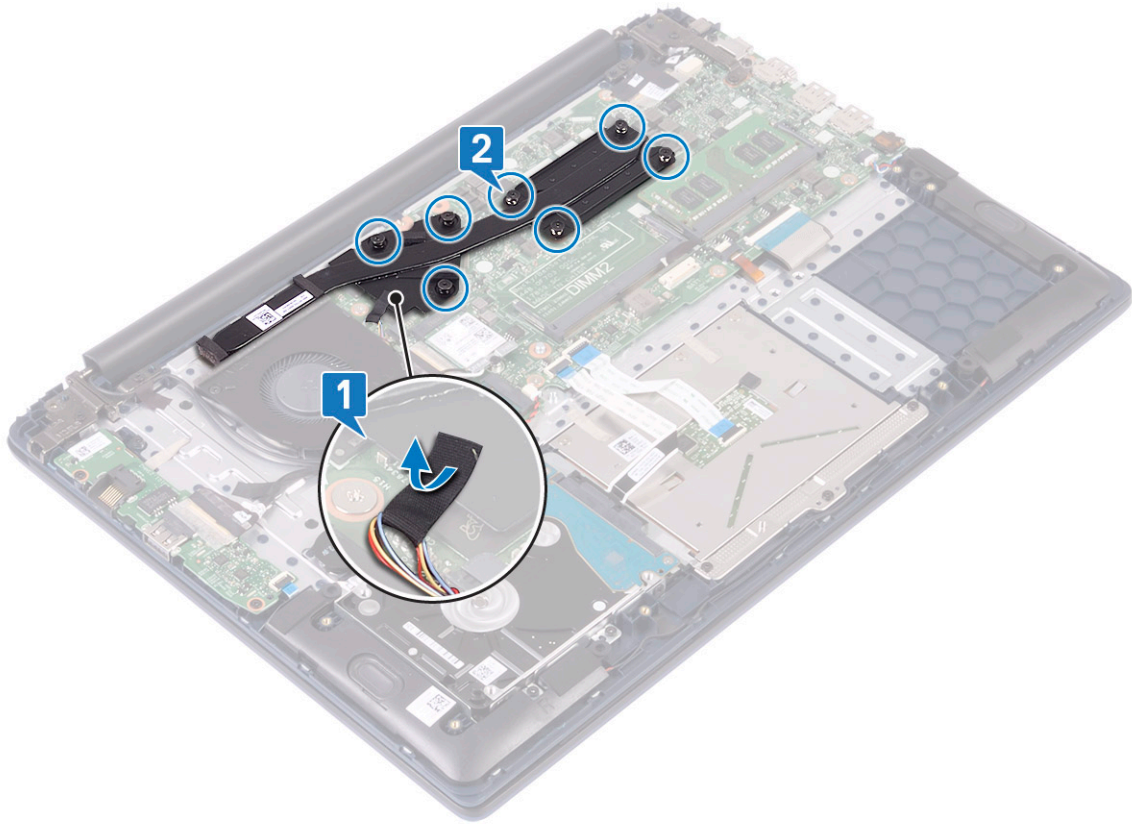4   Affix the adhesive tape that secures the system fan cable to the heatsink [4].

5   Install the:
    a   battery
    b   base cover
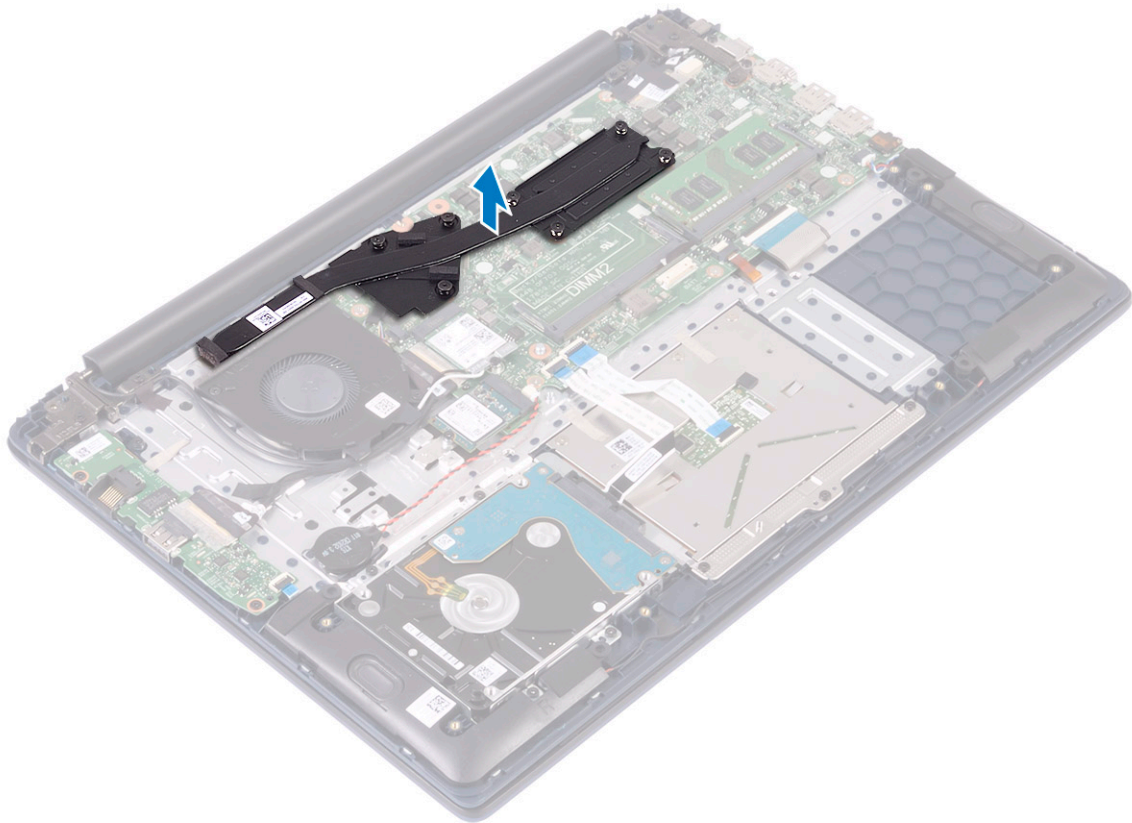6   Follow the procedure in After working inside your computer.

Heat sink

Removing the heatsink

1   Follow the procedure in Before working inside your computer.
2   Remove the:
    a   base cover
    b   battery
3   To remove the heatsink:
    a   Peel the adhesive tape that secures the system fan cable to the heatsink [1].
    b   Loosen the seven captive screws that secure the heatsink to the system board in sequential order as indicated on the heatsink[2].
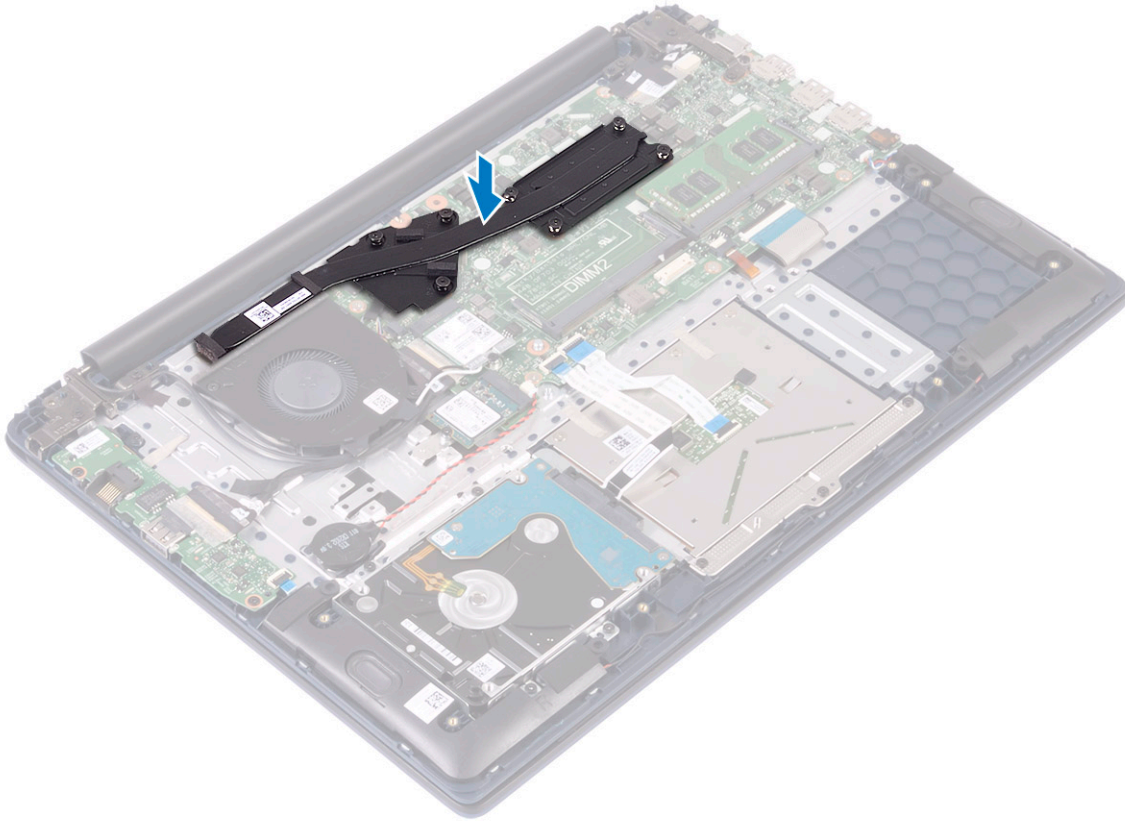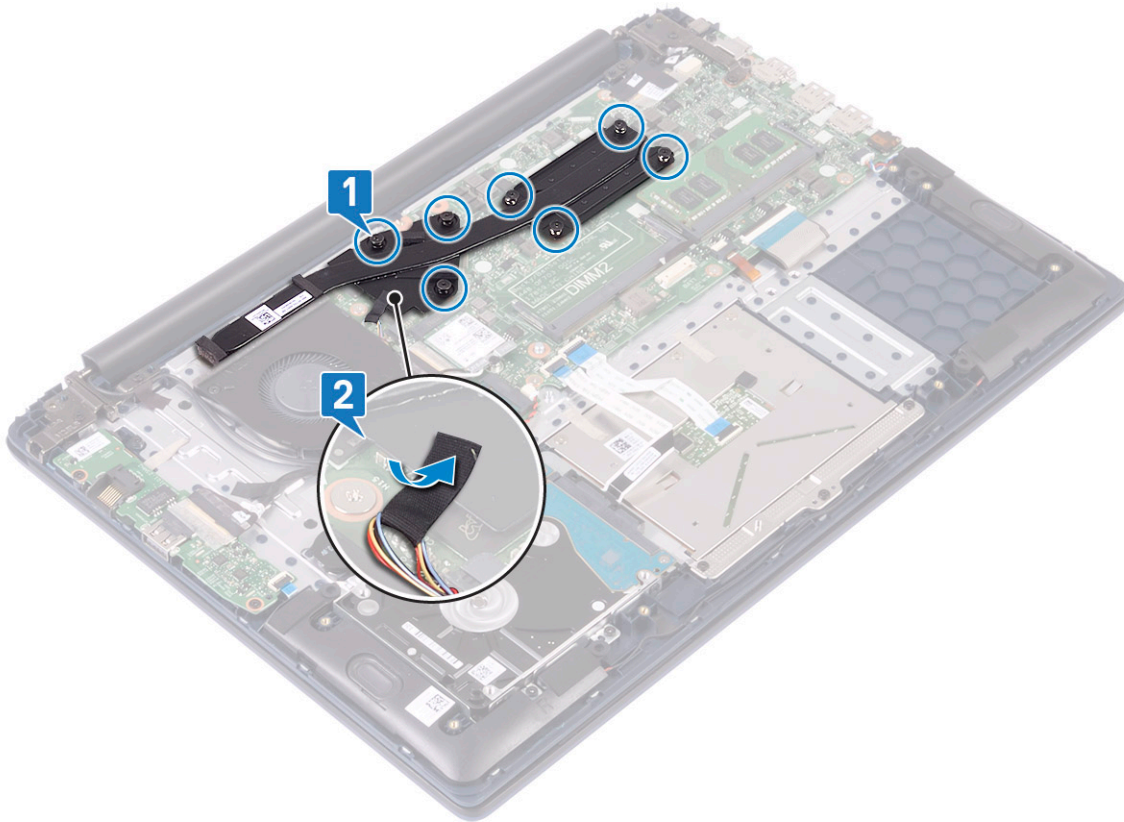
c   Lift the heatsink away from the system board .

Installing the heat sink

1   Align and place the heatsink to the slot in the system board .

2   Tighten the 7 captive screws in sequential order as indicated on the heatsink to secure the heatsink to the system board [1].

3   Affix the system fan cable adhesive tape to the heatsink [2].

4   Install the:
   a   battery
   b   base cover
5   Follow the procedure in After working inside your computer.

Input output board

Removing the Input and Output board

1   Follow the procedure in Before working inside your computer.
2   Remove the:
   a   base cover
   b   battery
   c   system fan
3   To remove the IO board:
   a   Peel the adhesive tape that secures the IO board connector [1].
   b   Open the IO board connector latch and disconnect IO board cable from the connector on the IO board [2].
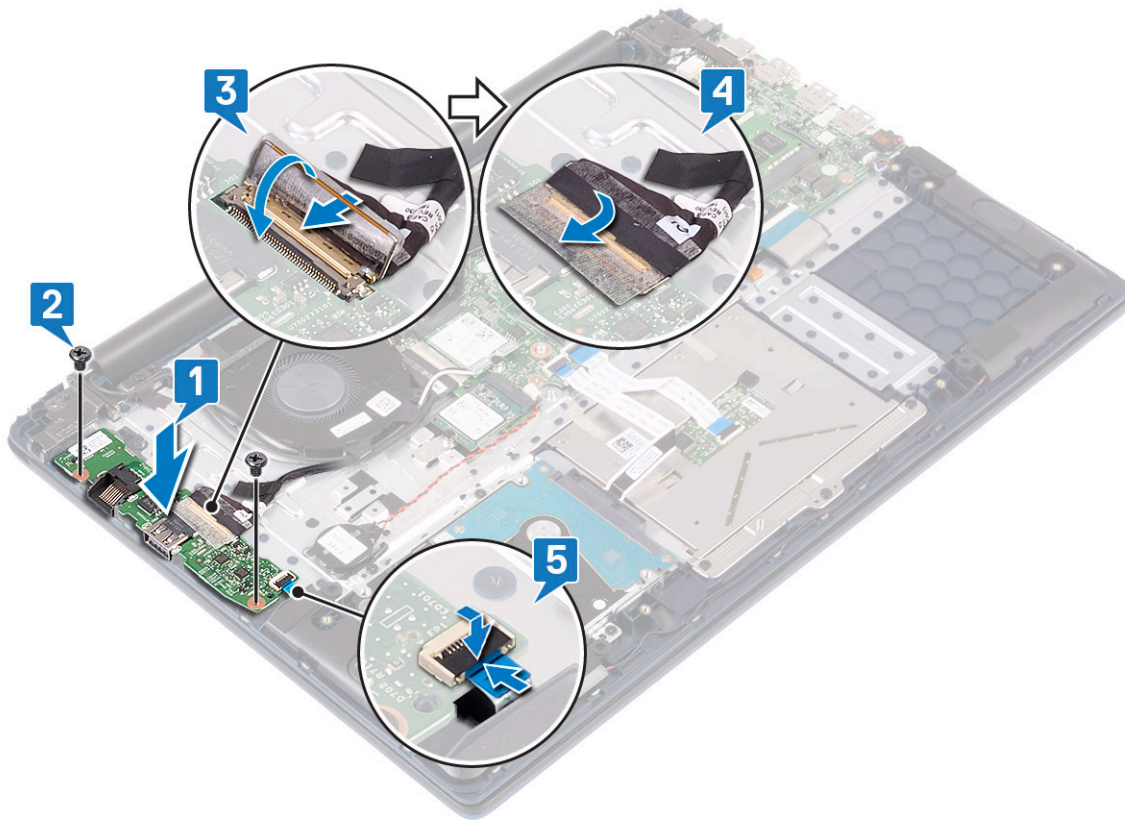   c   Disconnect the fingerprint reader cable from the connector on the IO board [3].

   ⓘ NOTE: **This step is applicable only to the systems that are shipped with power button with fingerprint reader.**
   d   Remove the two (M2x3) screws that secure the IO board to the palmrest and keyboard assembly [4].
   e   Lift the IO board away from the system [5].
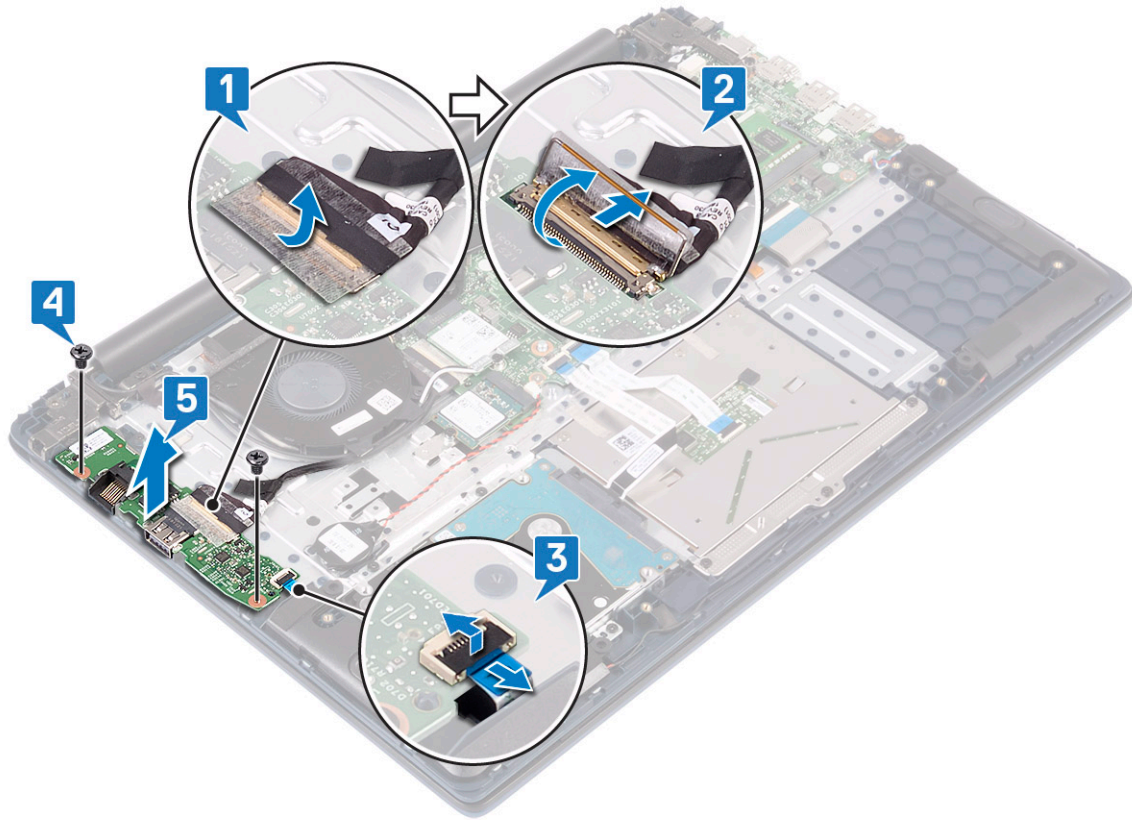
Installing the Input and Output board

1 Align and place the IO board to the slot on the palmrest and keyboard assembly [1].
2 Replace the two (M2x3) screws to secure the IO board to the palmrest and keyboard assembly [2].
3 Connect the IO board cable to the connector on the IO board and close the IO board connector latch [3].
4 Affix the adhesive tape to secure the IO board connector [4].
5 Connect the fingerprint reader cable to the connector on the IO board [5].

ⓘ NOTE: This step is applicable only to the systems that are shipped with power button with fingerprint reader.

6 Install the:

    a system fan

    b battery

    c base cover

7 Follow the procedure in After working inside your computer.

Display assembly

Removing the display assembly

1 Follow the procedure in Before working inside your computer.

2 Remove the:

    a base cover

    b battery

    c WLAN

3 To remove the display assembly:

    a Peel the adhesive that secures the WLAN antenna cable to the palmrest and keyboard assembly [1].

    b Unroute the WLAN antenna cable from the routing channel [2].

    c Peel the adhesive tape that secures the display cable to the display cable connector [3].

    d Open the display cable connector latch and disconnect the display cable from the connector on the system board [4].

    e Unroute the display cable from the routing channel [5].
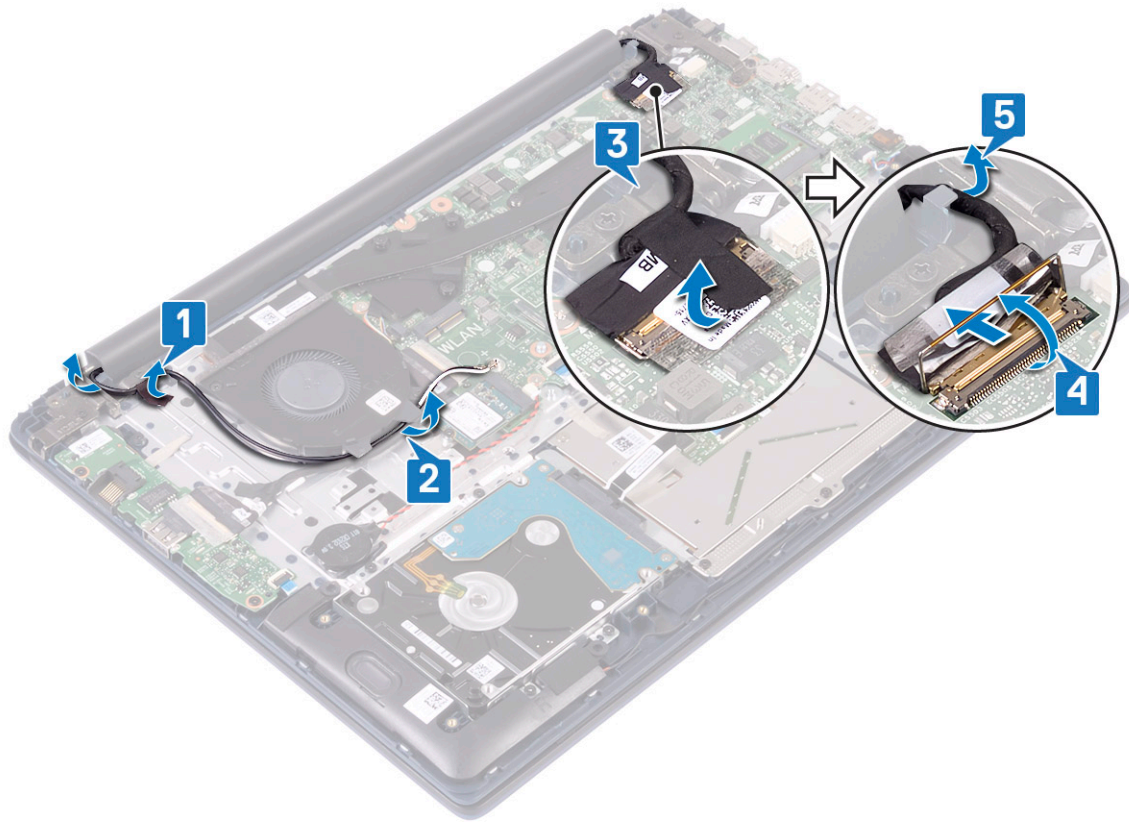
f   Remove the five (M2.5x5) screws that secure the display hinges to the palmrest and keyboard assembly .
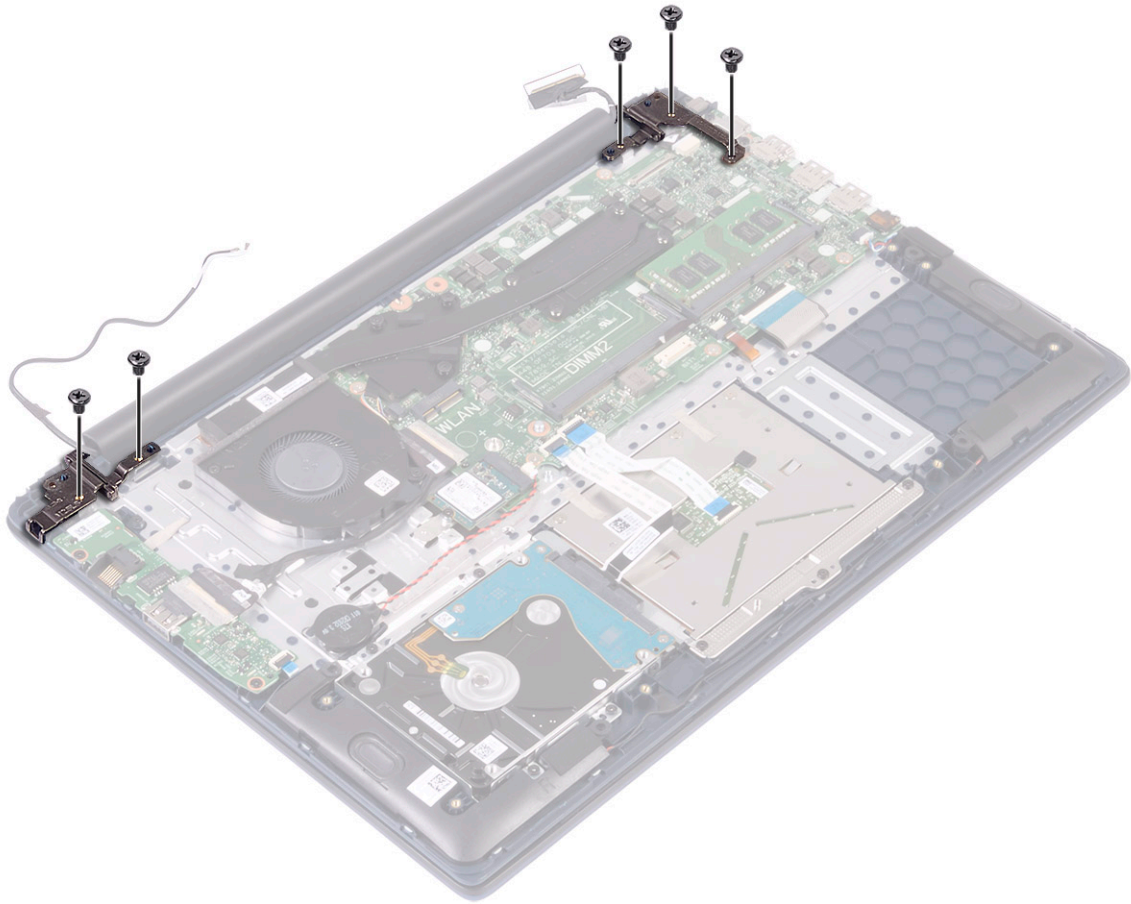
g Open the display assembly at an angle of 90 degrees.

h   Lift the display assembly away from the palm-rest and keyboard assembly.
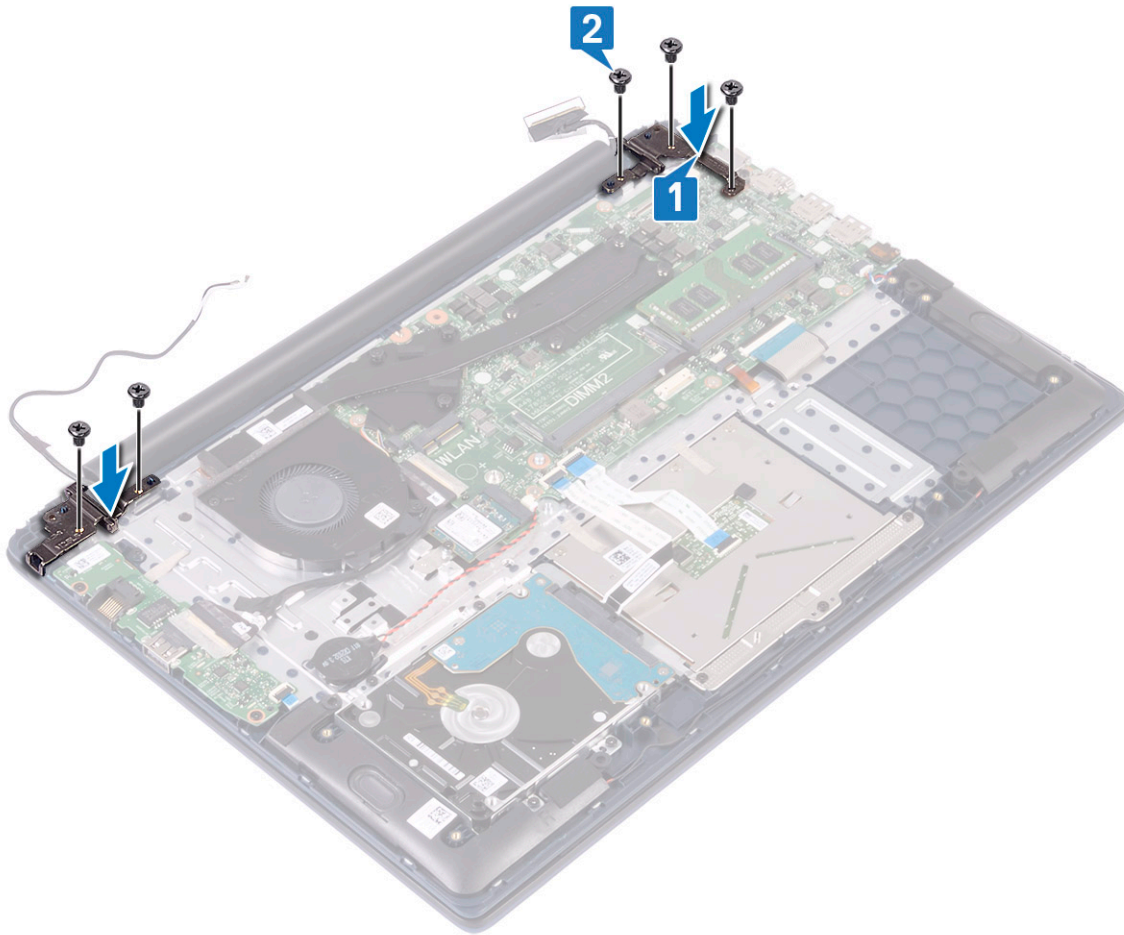
Installing the display assembly

1   Slide and align the palmrest and keyboard assembly at an angle under the hinges on the display assembly.

2   Place and align the screw holes on the display hinges with the screw holes on the palm-rest and keyboard assembly [1].

3   Replace the five (M2.5x5) screws to secure the display hinges to the palmrest and keyboard assembly [2].

4   Affix the adhesive tape to secure the WLAN antenna cable to the plamrest and keyboard assembly [1].

5   Reroute the WLAN antenna cable through the routing channel [2].

6   Reroute the display cable through the routing channel [3].

7   Connect the display cable to the connector on the system board and close the display cable connector latch [4].

8   Affix the adhesive tape to secure the display cable to the display cable connector [5].
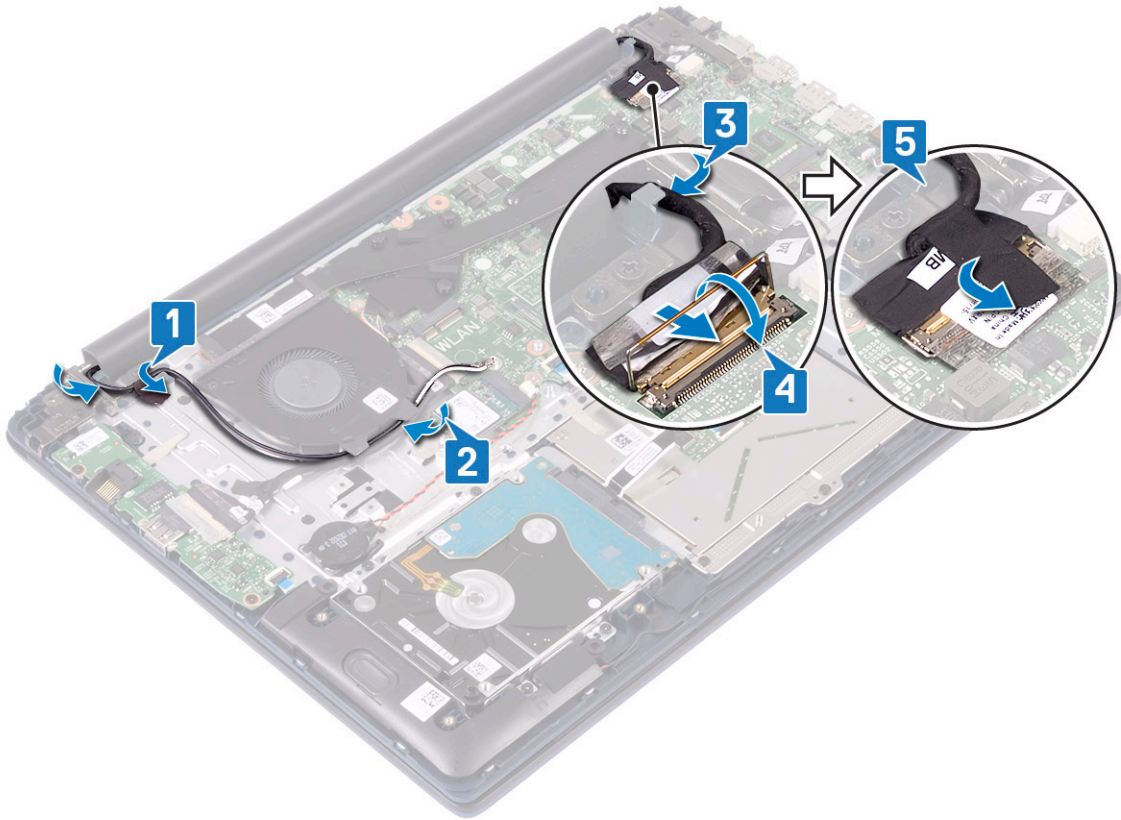
9   Install the:
    a   WLAN
    b   battery
    c   base cover

10 Follow the procedure in After working inside your computer.
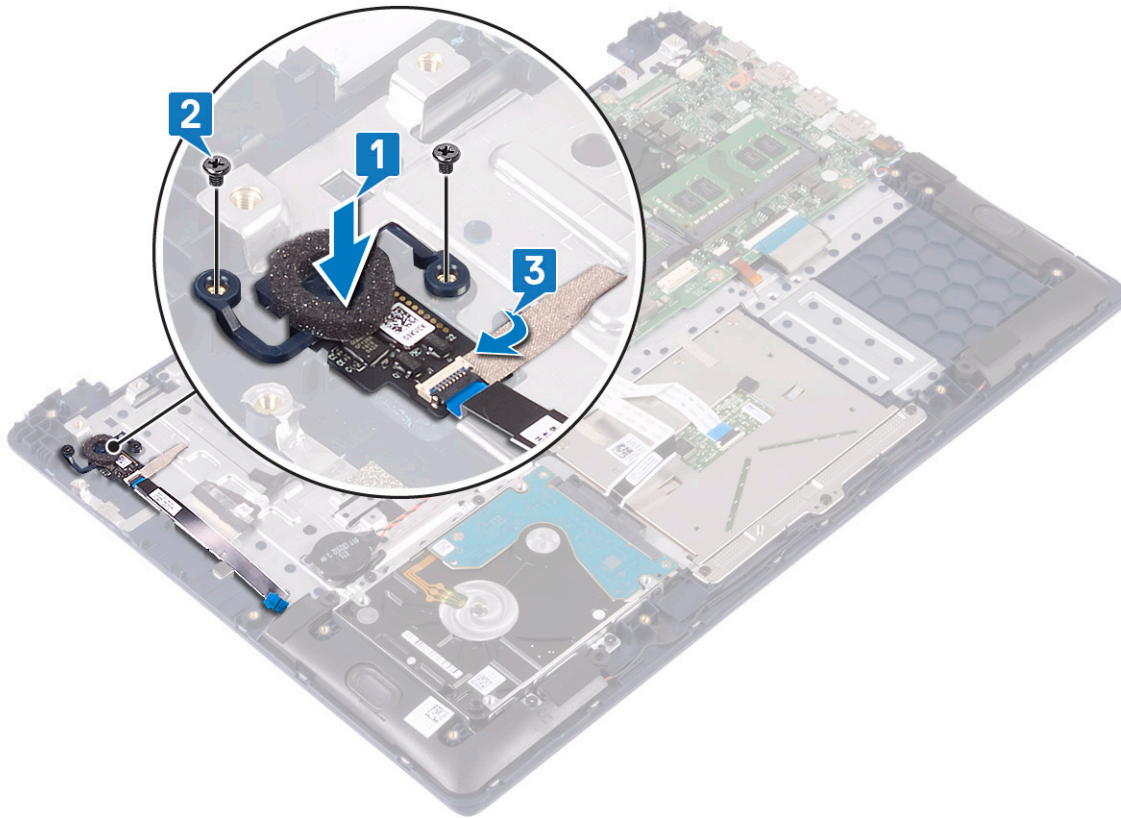
Power button with fingerprint reader

Removing the power button with fingerprint reader

1   Follow the procedure in Before working inside your computer.
2   Remove the:
    a   base cover
    b   battery
    c   system fan
    d   display assembly
    e   Input output board
3   To remove the power button with fingerprint reader:
    a   Peel the adhesive tape that secures the fingerprint reader board to the palmrest and keyboard assembly [1].
    b   Remove the two (M2x3) screws that secure the power button to the palmrest and keyboard assembly [2].
    c   Lift the power button with fingerprint reader away from the palmrest and keyboard assembly. [3].
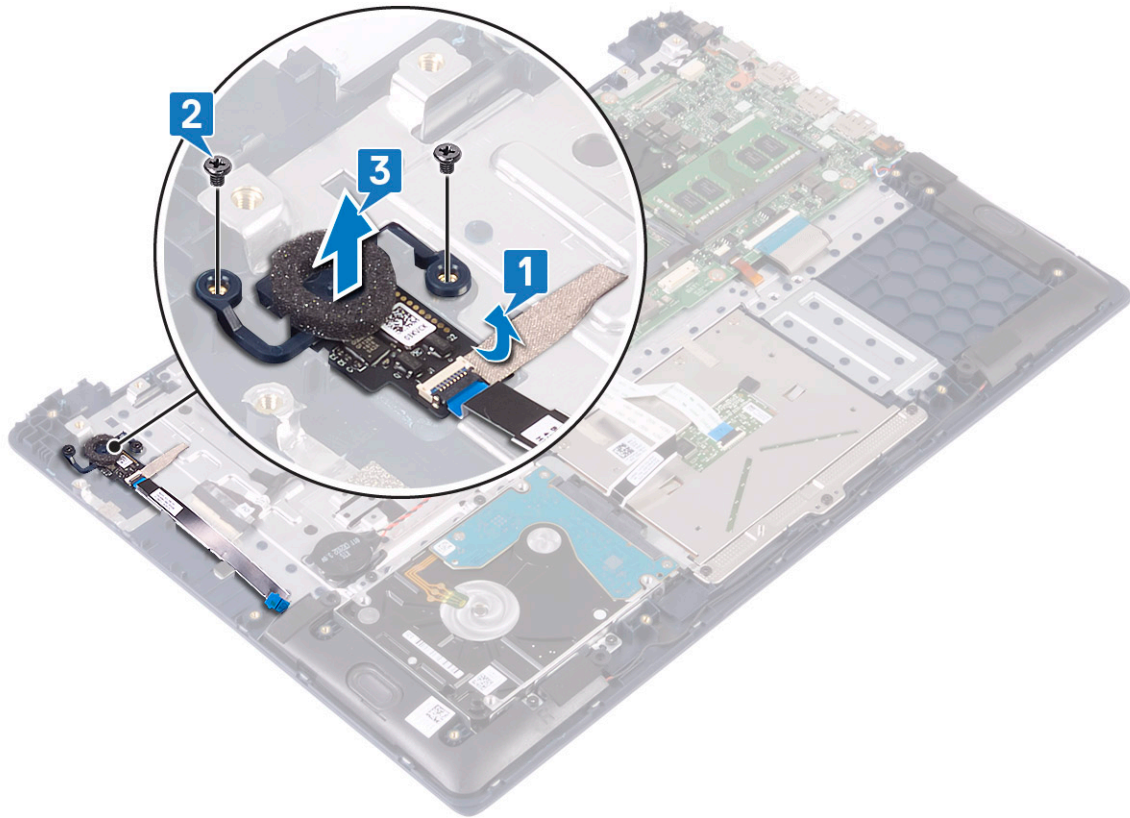
Installing the power button with fingerprint reader

1   Align and place the power button with fingerprint reader to the slot on the palmrest and keyboard assembly [1].
2   Replace the two (M2x3) screws to secure the power button with fingerprint reader to the palmrest and keyboard assembly [2].
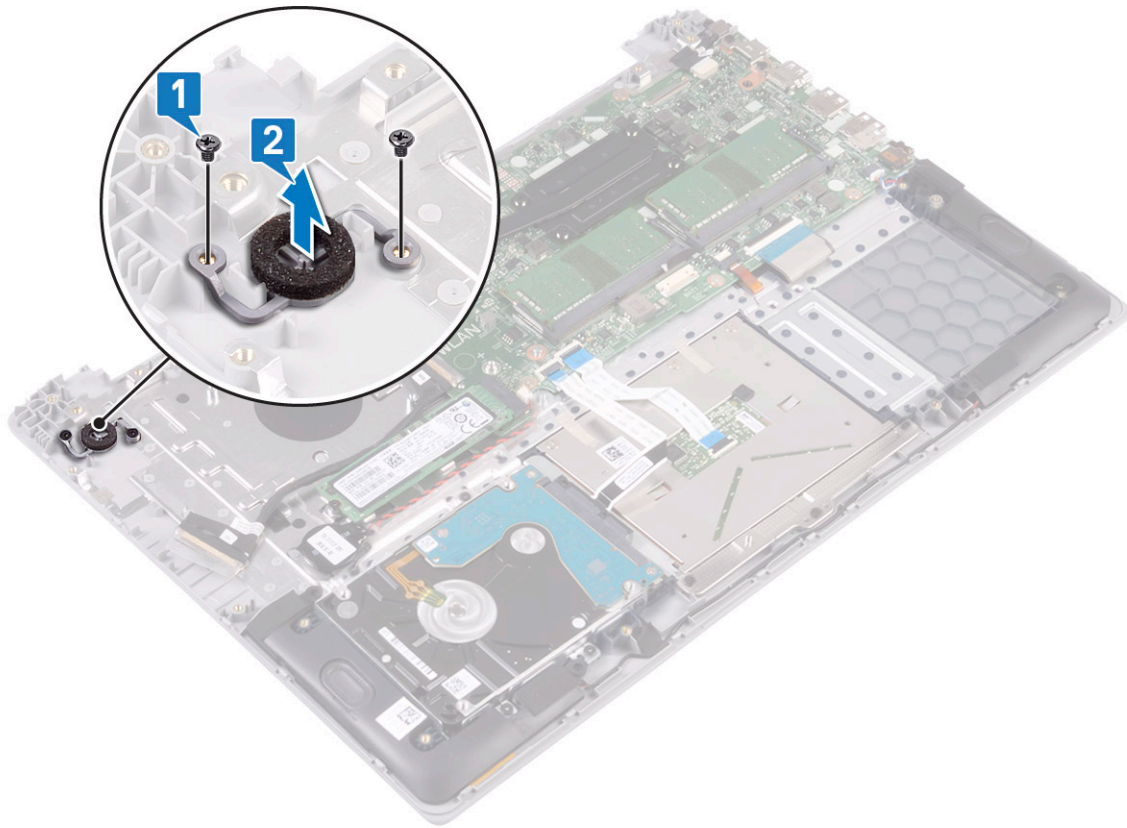3   Affix the adhesive tape to secure the fingerprint reader board to the palmrest and keyboard assembly [3].

4   Install the:
    a   Input output board
    b   display assembly
    c   system fan
    d   battery
    e   base cover
5   Follow the procedure in After working inside your computer.

Power button

Removing the power button

1   Follow the procedure in Before working inside your computer.
2   Remove the:
    a   base cover
    b   battery
    c   system fan
    d   display assembly
    e   Input and output board
3   To remove the power button:
    a   Remove the two (M2x3) screws that secure the power button to the palmrest and keyboard assembly [1].
    b   Lift the power button away from the palmrest and keyboard assembly. [3].

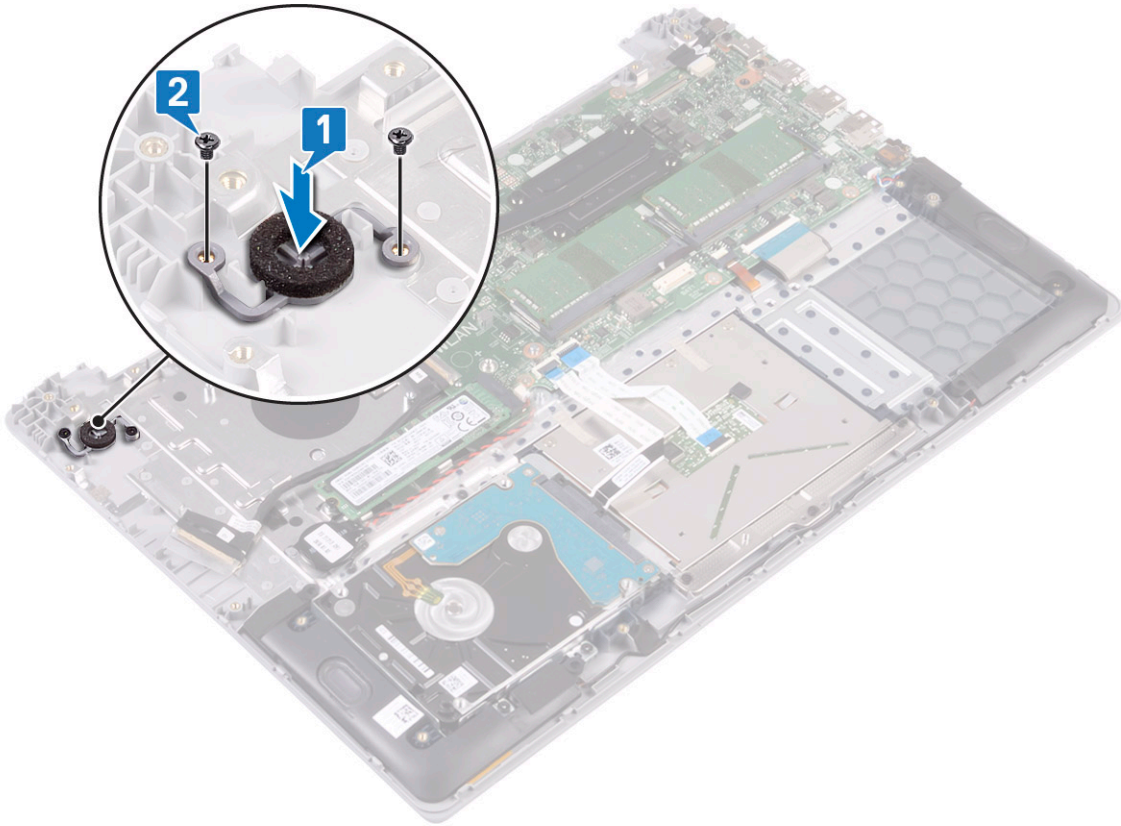# Installing the power button

1. Align and place the power button with fingerprint reader to the slot on the palmrest and keyboard assembly [1].
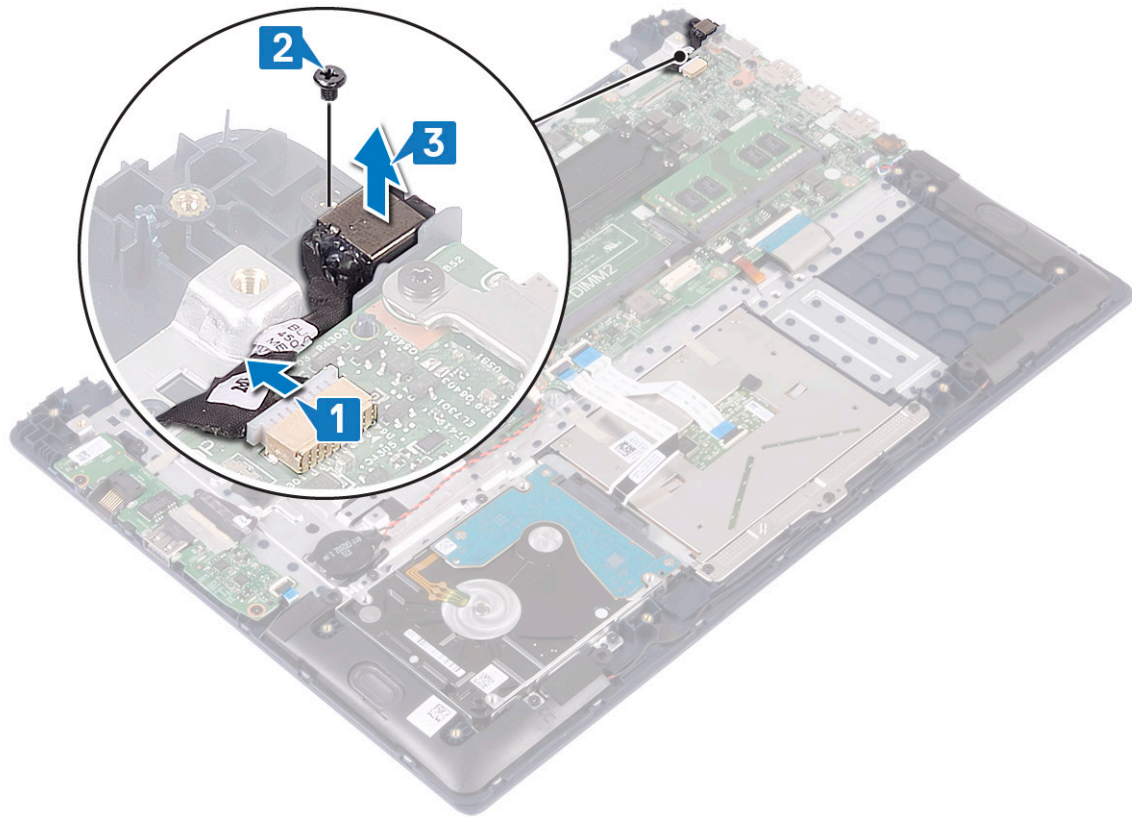2. Replace the two (M2x3) screws to secure the power button to the palmrest and keyboard assembly [2].

3   Install the:

    a   Input output board

    b   display assembly

    c   system fan

    d   battery

    e   base cover

4   Follow the procedure in After working inside your computer.

Power–adapter board

Removing the power-adapter port

1   Follow the procedure in Before working inside your computer.

2   Remove the:

    a   base cover

    b   battery

    c   display assembly

3   To remove the power-adapter port:

    a   Disconnect the power-adapter cable from the connector on the system board [1].

    b   Remove the single (M2x3) screw that secures the power-adapter port to the palmrest and keyboard assembly [2].

    c   Lift the power-adapter port away from the system [3].

Installing the power-adapter port

1. Align and place the power-adapter port to the slot on the palmrest and keyboard assembly [1].
2. Replace the single (M2x3) screw to secure the power-adapter port to the palmrest and keyboard assembly [2].
3. Connect the power-adapter cable to the connector on the system board [3].

4   Install the:
    a   display assembly
    b   battery
    c   base cover
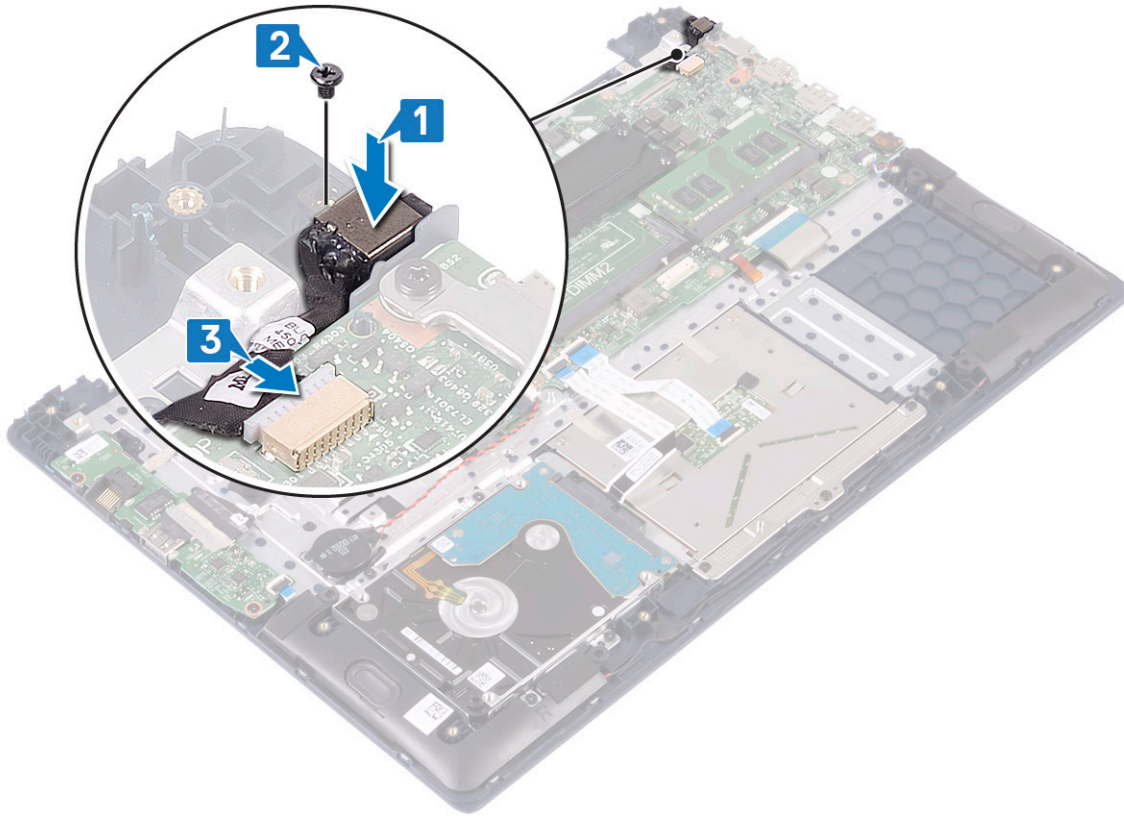5   Follow the procedure in After working inside your computer.

Touchpad
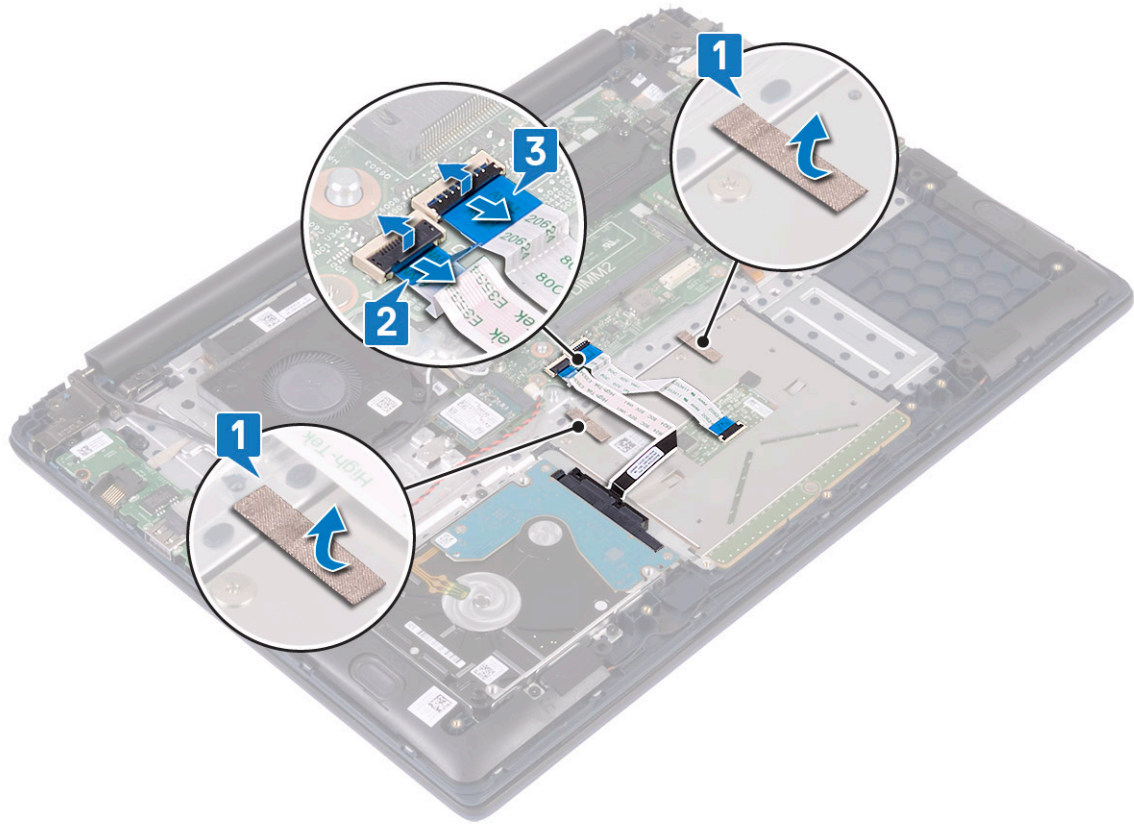
Removing the touchpad

1   Follow the procedure in Before working inside your computer.
2   Remove the:
    a   base cover
    b   battery
3   To remove the touchpad:
    a   Remove the four (M2x3) screws that secure the touchpad bracket to the palmrest and keyboard assembly [1].
    b   Lift the touchpad bracket away from the system [2].
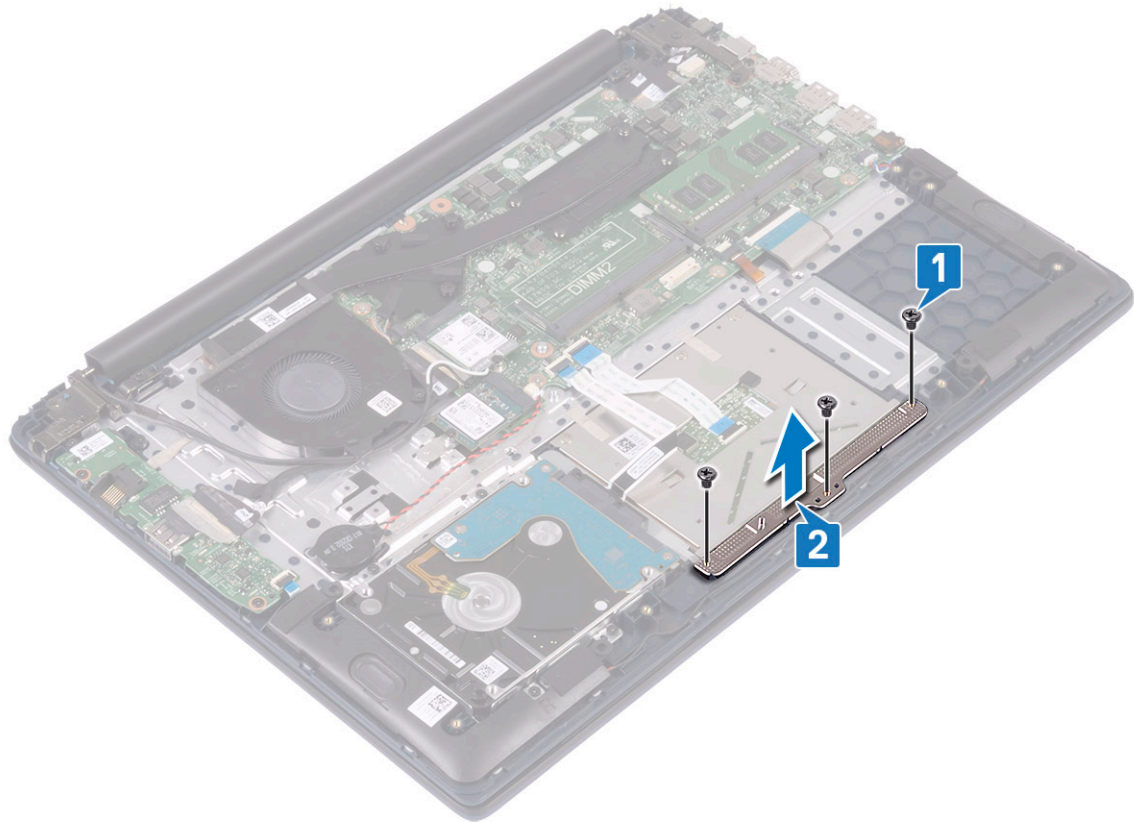
c   Peel the adhesive tapes that secure the touchpad to the palmrest and keyboard assembly [1].

d   Open the connector latch and disconnect the hard drive cable from the connector on the system board [2].

e   Open the connector latch and disconnect the touchpad cable from the connector on the system board [3]

f   Remove the four (M2x2 Big Head) screws that secure the touchpad to the palm-rest and keyboard assembly [1].

g   Lift the touchpad away from the system [2].

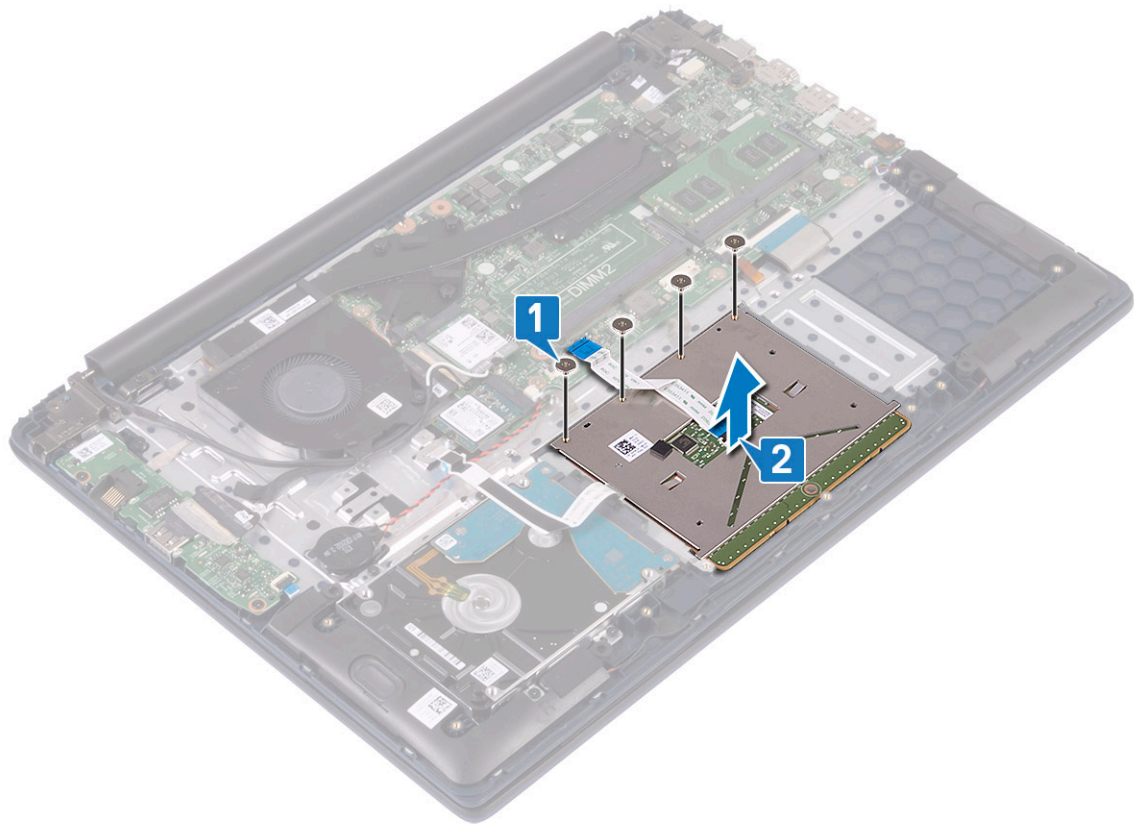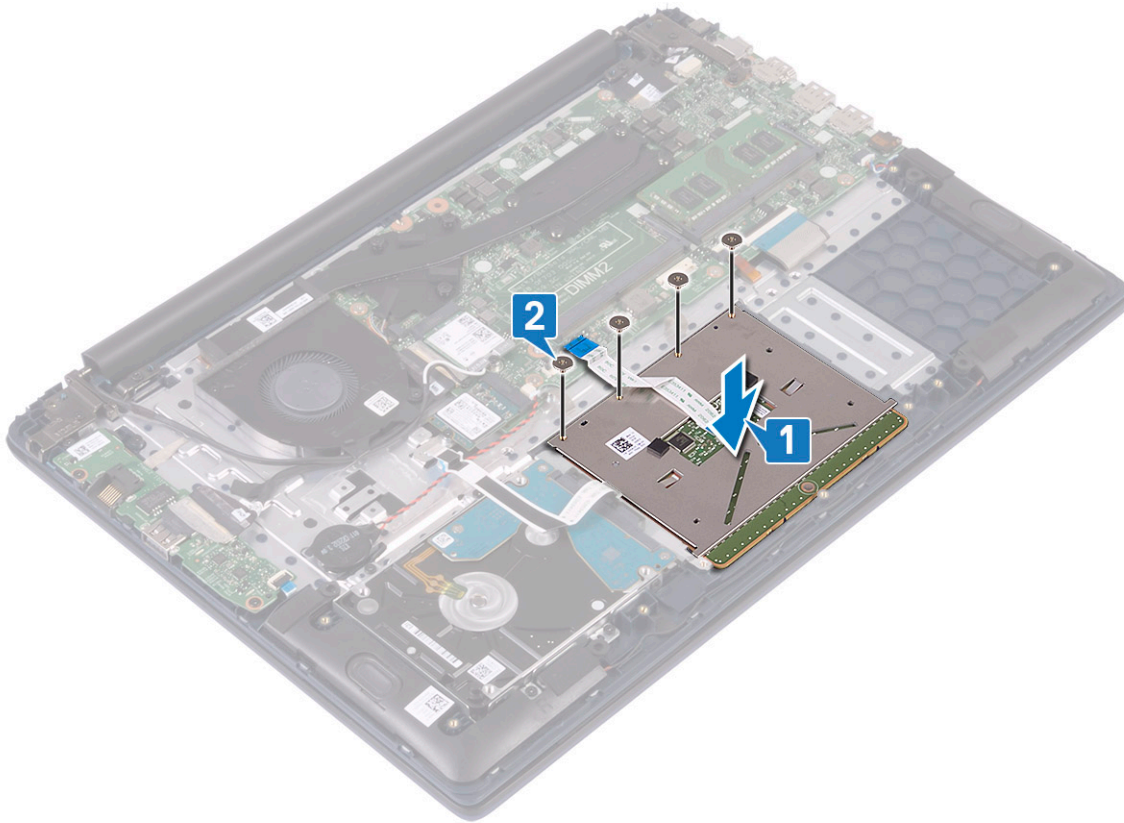# Installing the touchpad

1   Align and place the touchpad to the slot on the palmrest and keyboard assembly [1].

2   Replace the four (M2x2 Big Head) screws to secure the touchapd to the palmrest and keyboard assembly [2].

3   Affix the adhesive tape to secure the touchpad to the palmrest and keyboard assembly [1].

4   Connect the hard drive cable to the connector on the system board and close the connector latch [2].

5   Connect the touchpad cable to the connector on the system board and close the connector latch [3]
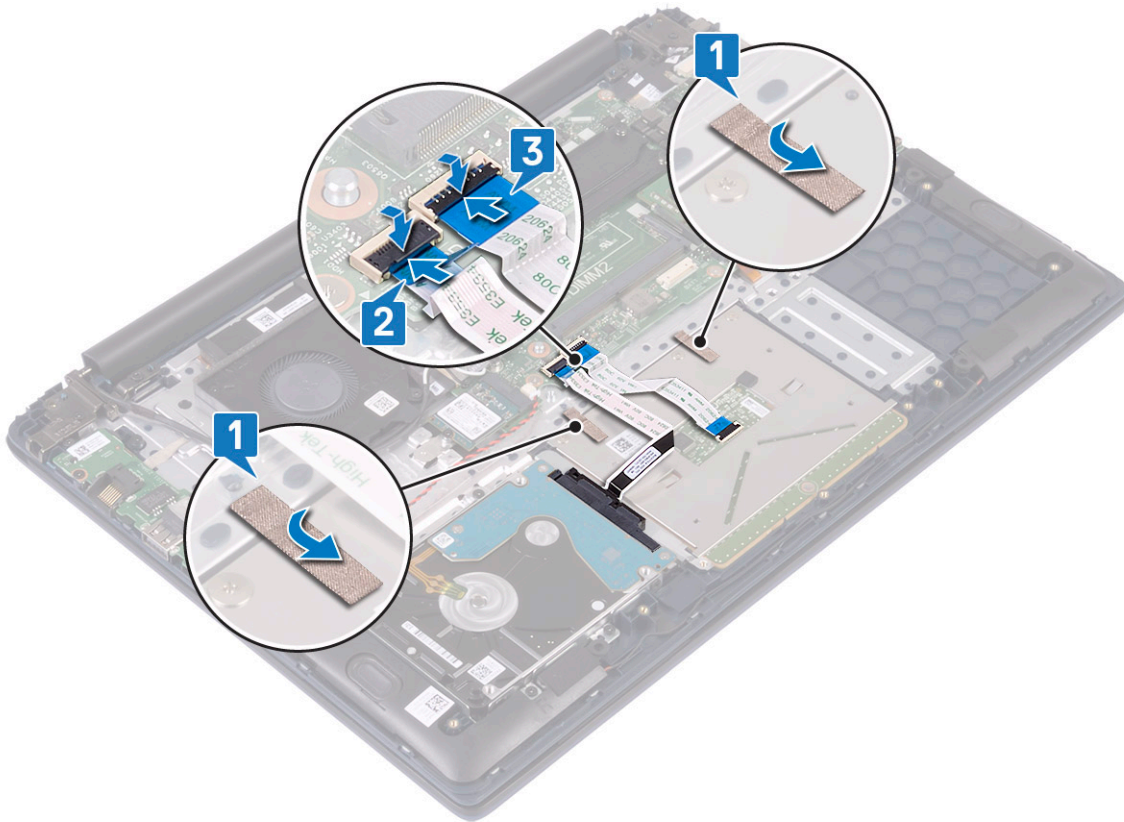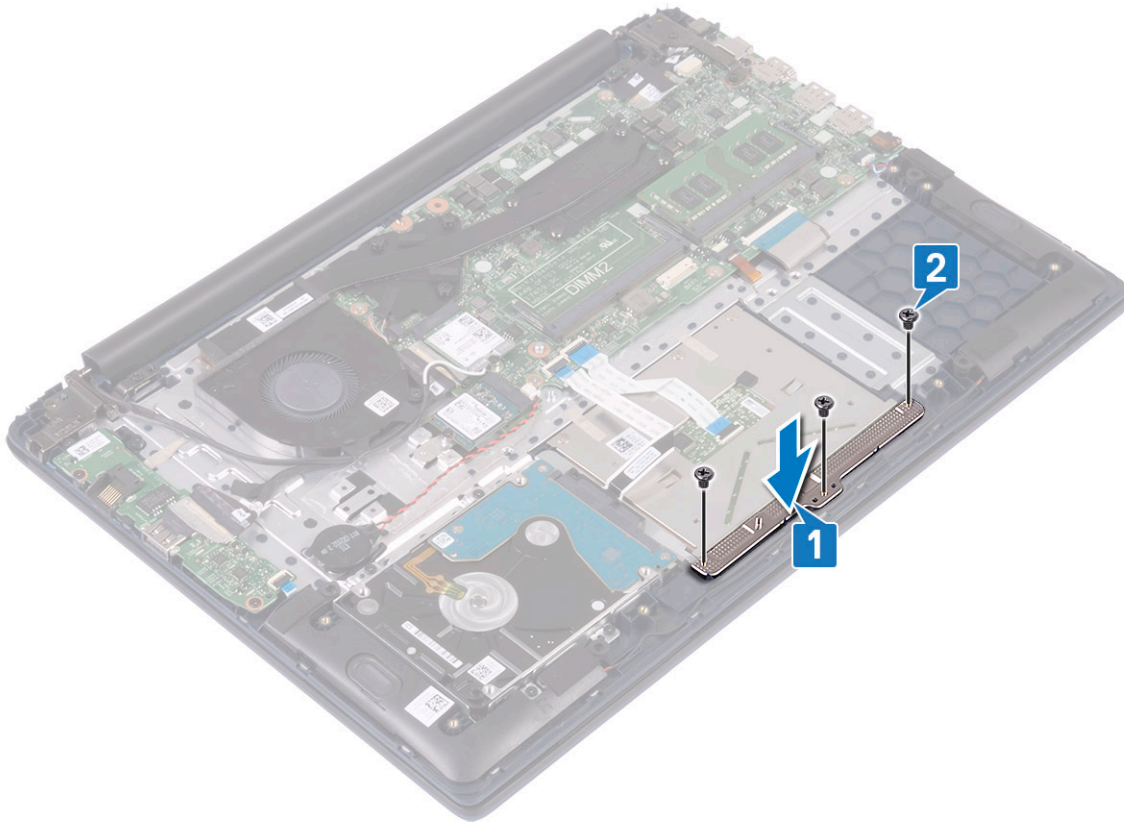
6   Align and place the touchpad bracket to the slot on the plamrest and keyboard assembly [1].

7   Remove the four (M2x3) screws to secure the touchpad bracket to the palmrest and keyboard assembly [2].

8   Install the:
    a   battery
    b   base cover
9   Follow the procedure in After working inside your computer.

System board

Removing the system board

1   Follow the procedure in Before working inside your computer.
2   Remove the:
    a   base cover
    b   battery
    c   system fan
    d   memory module
    e   WLAN
    f   SSD
    g   heatsink
    h   display assembly
3   To remove the system board:
    a   Peel the adhesive tape from the IO board connector [1].
    b   Lift the connector latch and disconnect the IO board cable from the connector on the system board [2].
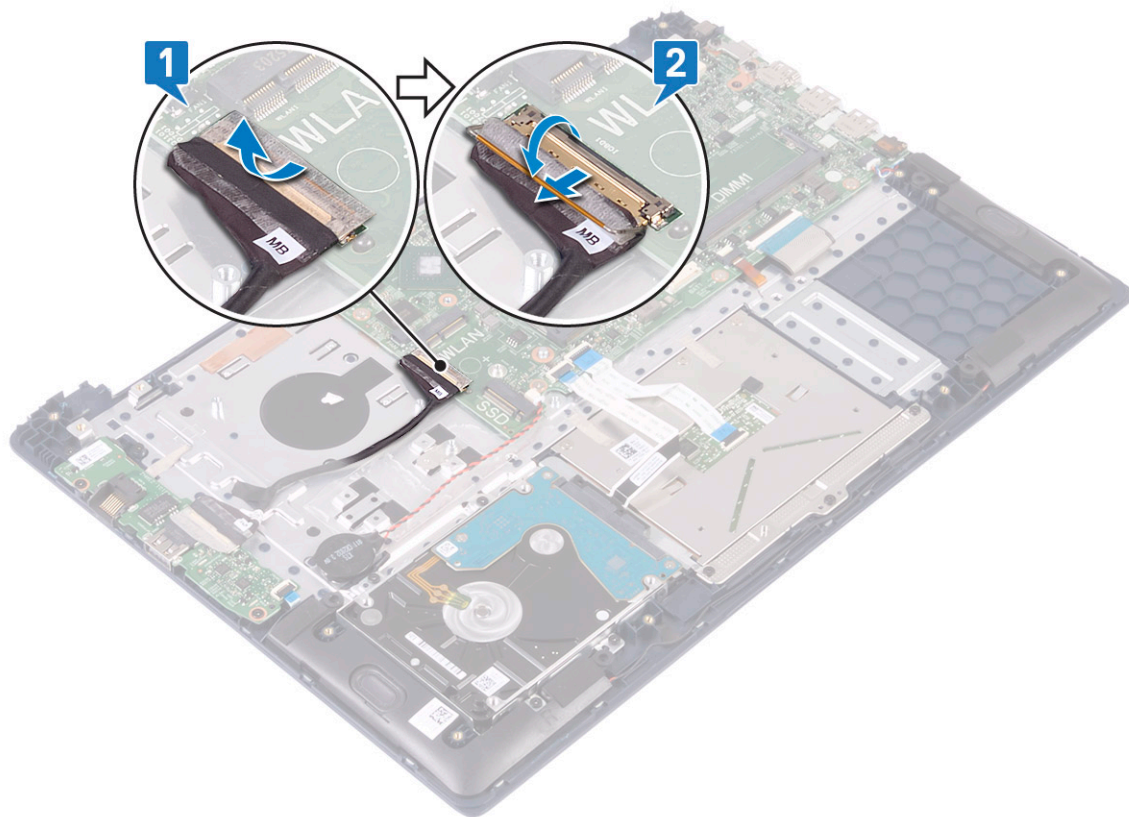
c   Remove the following cables:

- coin-cell battery cable [1]
- hard drive cable [2]
- touchpad cable [3]
- power-adapter cable [4]
- speaker cable [7]
- keyboard cable [8]
- keyboard backlight cable (optional) [9]

d   Remove the two (M2x3) screws that secure the USB Type-C port bracket to the system board [5].

e   Lift the USB Type-C port bracket away from the system [2].

f   Remove the five (M2x2 Big head) screws that secures the system board to the palmrest and keyboard assembly [1].

g   Lift the system board away from the system [2].
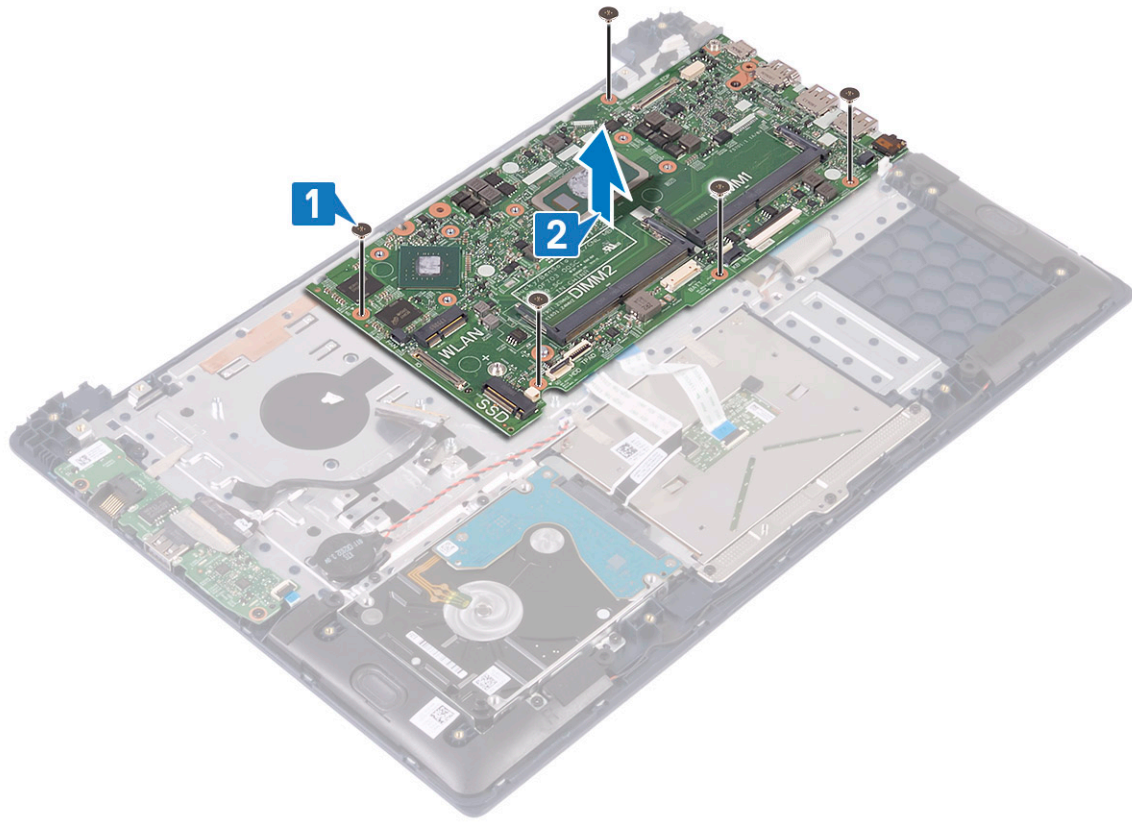
Installing the system board

1 Place the system board and align the screw holes of the system board to the screw holes on the palmrest and keyboard assembly [1].

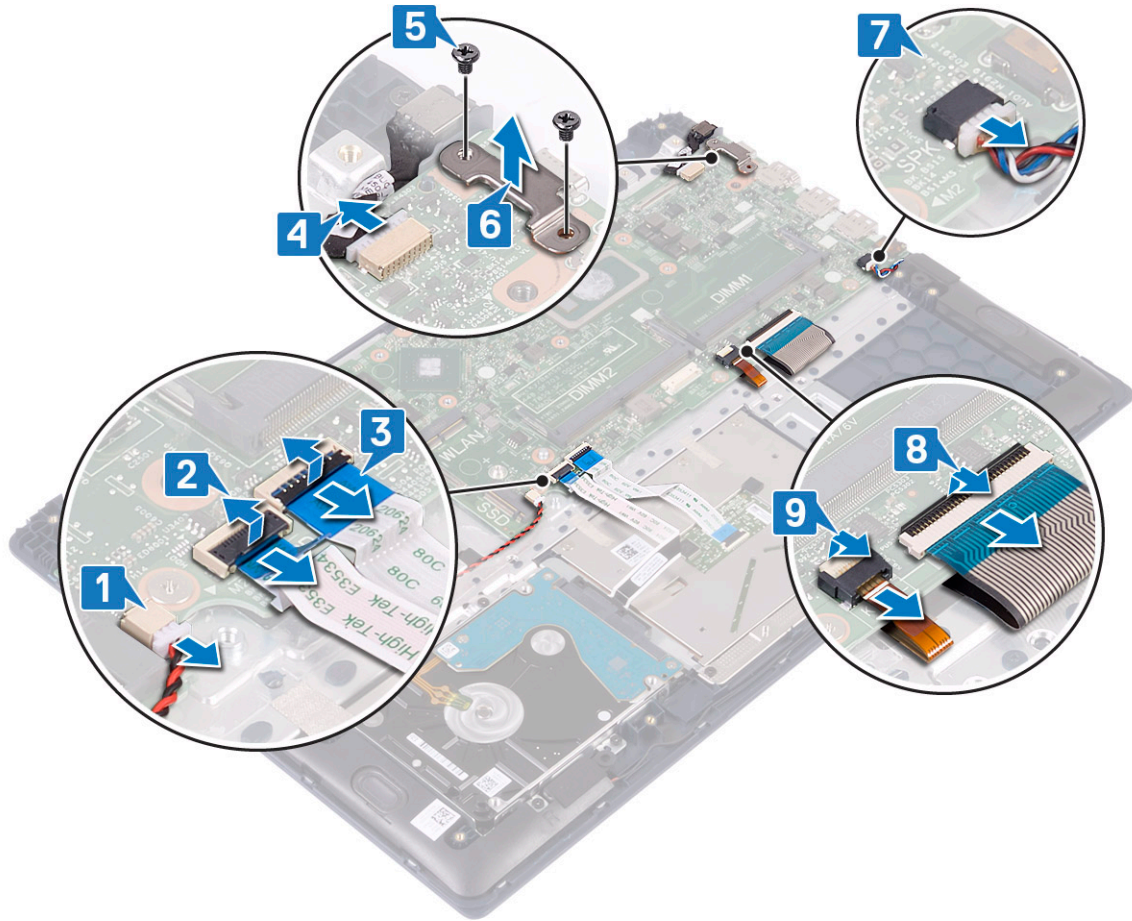2 Replace the five screws to secure the system board to the plamrest and keyboard assembly [2].
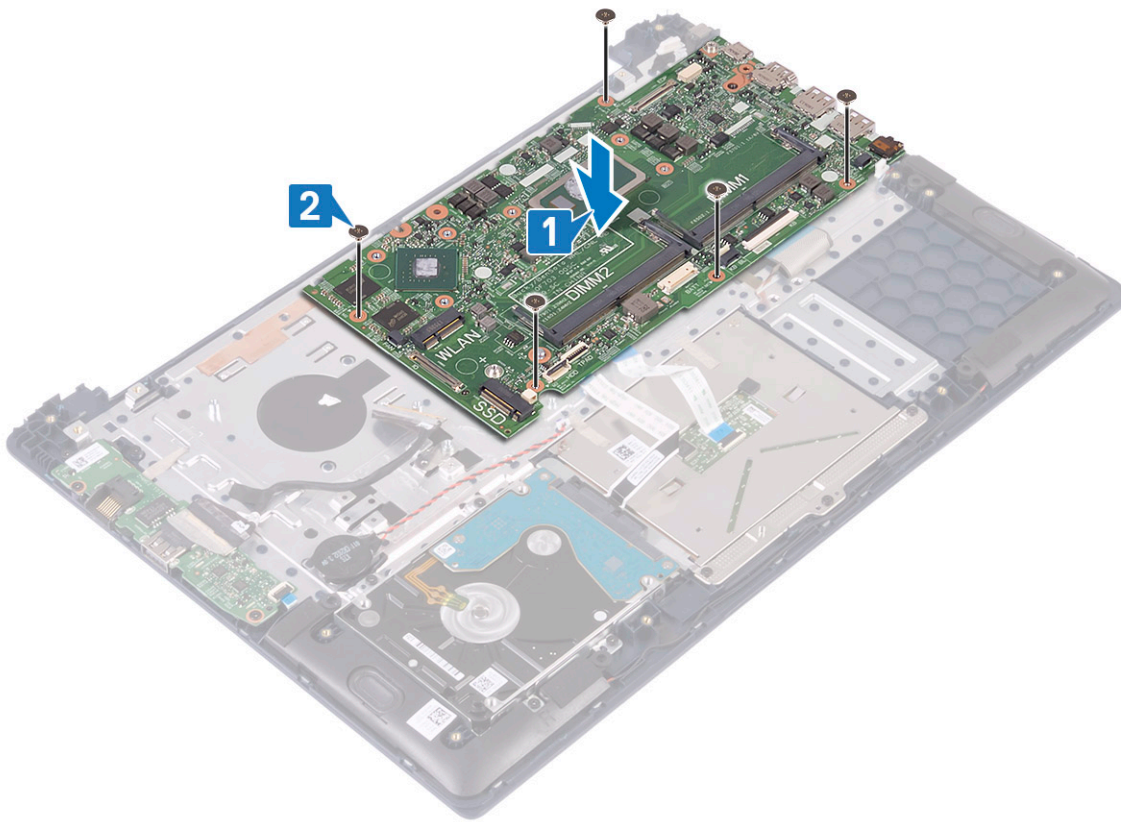
3   Connect the following cables:
- coin-cell battery cable [1]
- hard drive cable [2]
- touchpad cable [3]
- power-adapter cable [4]
- speaker cable [7]
- keyboard cable [8]
- keyboard backlight cable (optional) [9]

4   Place the USB Type-C port to the slot on the system board [5].

5   Replace the two (M2x3) screws to secure the USB Type-C port bracket to the system board [6].
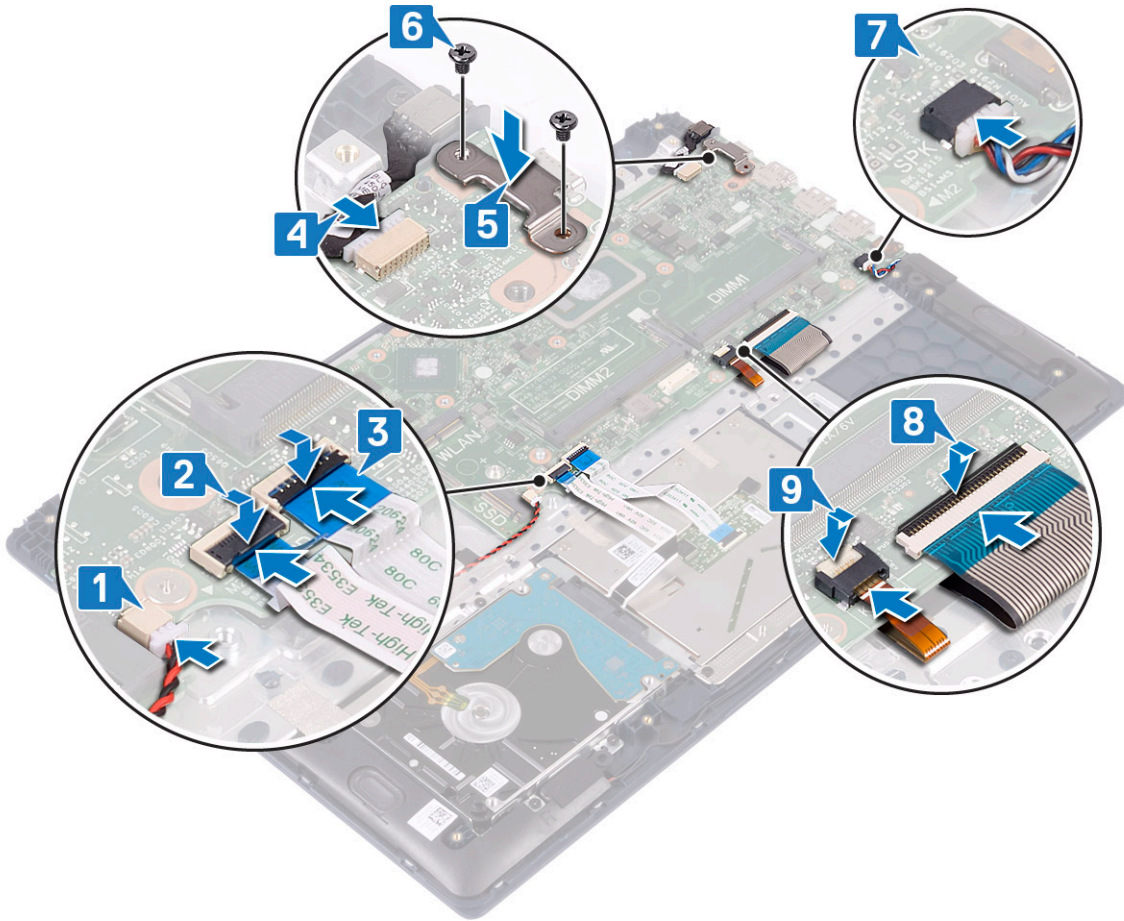
6   Connect the IO board cable to the connector on system board and close the connector latch [1].

7   Affix the adhesive tape to secure the IO cable connector [2].
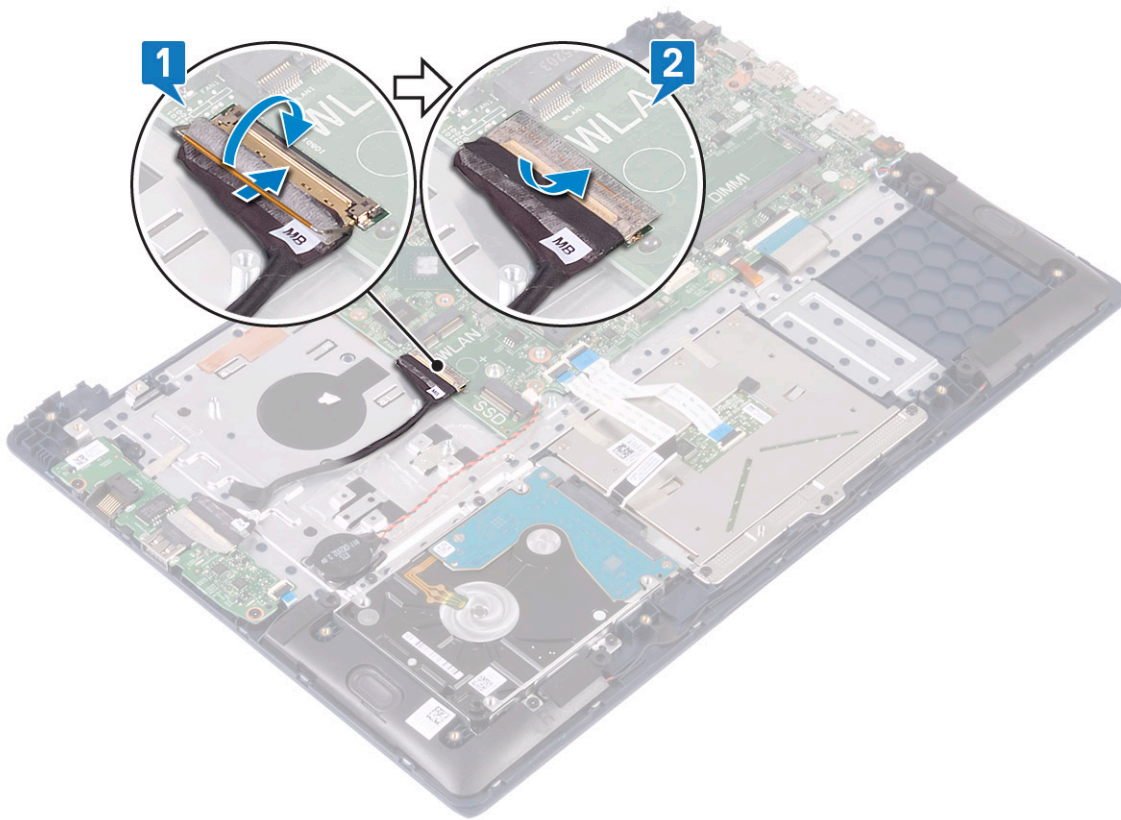
8 Install the:
   a display assembly
   b heatsink
   c SSD
   d WLAN
   e memory module
   f system fan
   g battery
   h base cover
9 Follow the procedure in After working inside your computer.

Palmrest and keyboard assembly

Removing the palmrest and keyboard assembly

1 Follow the procedure in Before working inside your computer.
2 Remove the:
   a base cover
   b battery
   c system fan
   d memory module
   e WLAN
   f coin cell battery
   g SSD
   h 2.5 inch HDD

      i   input and output board

      j   touchpad

      k   speakers

      l   heatsink

      m   display assembly

      n   power button with fingerprint

      o   power adapter port

      p   system board

3   After removing the above components, we are left with the palm-rest and keyboard assembly.
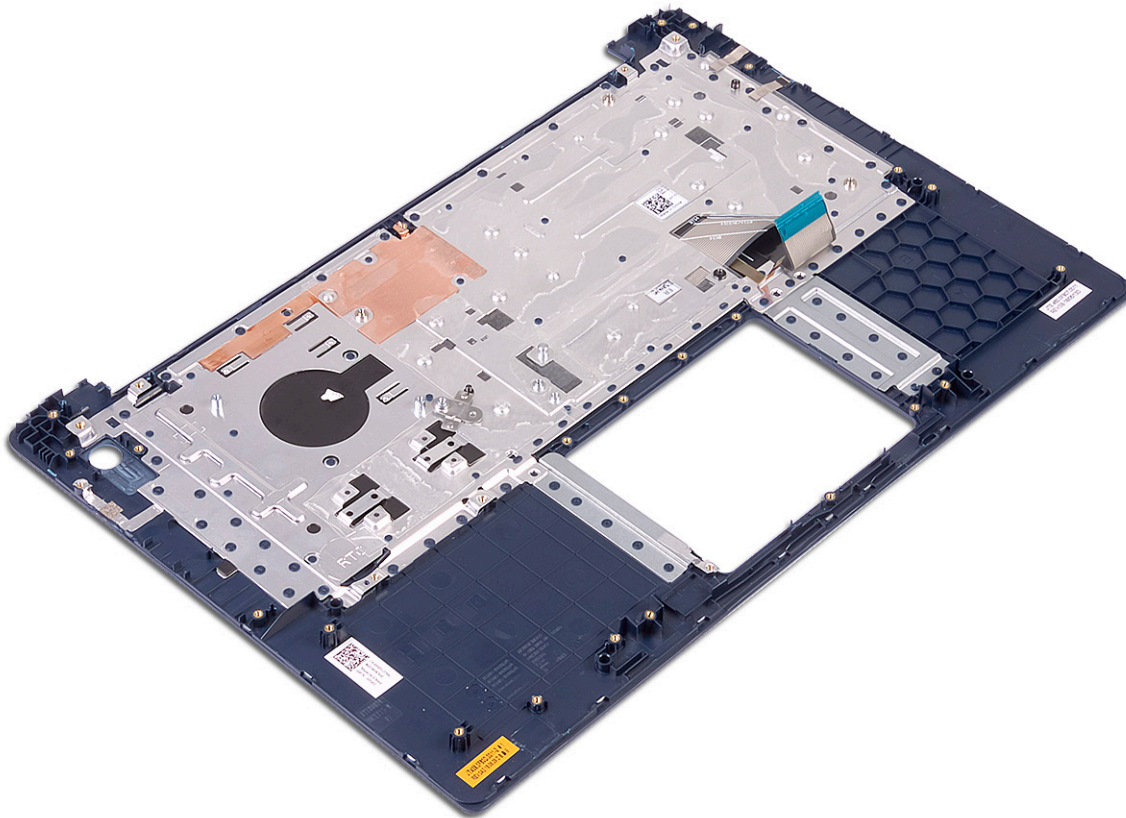
Display bezel

Removing the display bezel

1   Follow the procedure in Before working inside your computer.

2   Remove the:

      a   base cover

      b   battery

      c   WLAN

      d   display assembly

3   To remove display bezel:

      a   Using a plastic scribe pry the edges of the display bezel.

b   Lift the display bezel away from the display assembly.

Installing the display bezel

1   To install the display bezel:

    a   Place the display bezel on the display assembly.
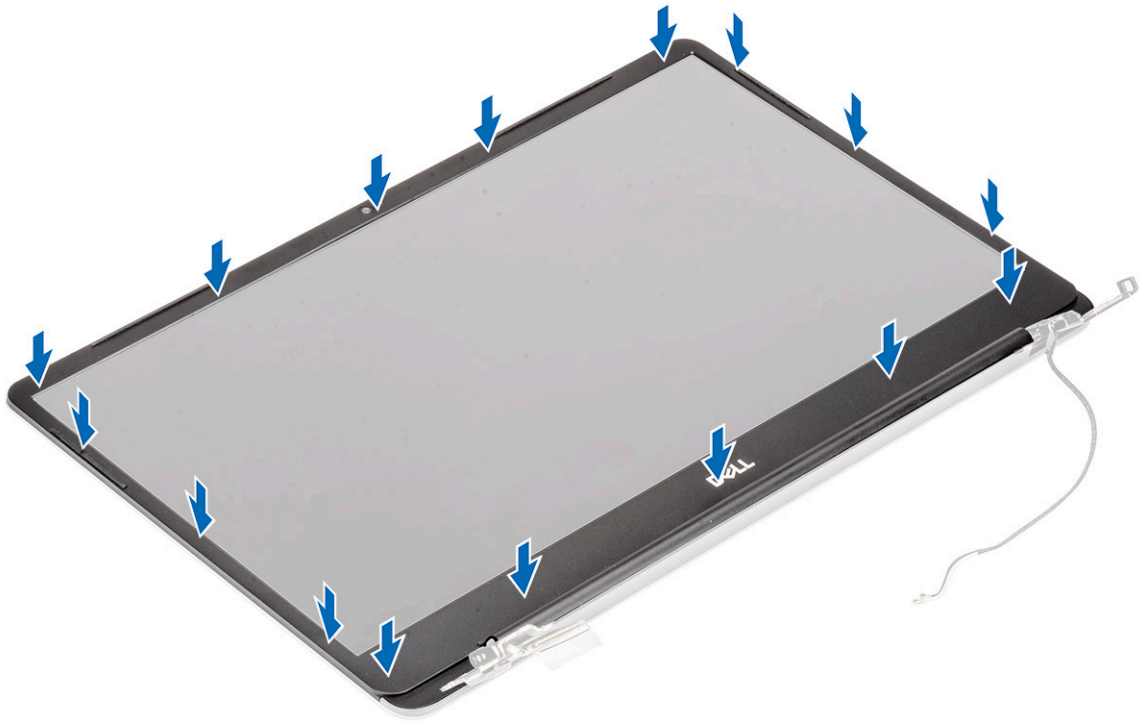
b Press the edges of the display bezel until it clicks onto the display assembly.

2 Install the:
   a display assembly
   b WLAN
   c battery
   d base cover
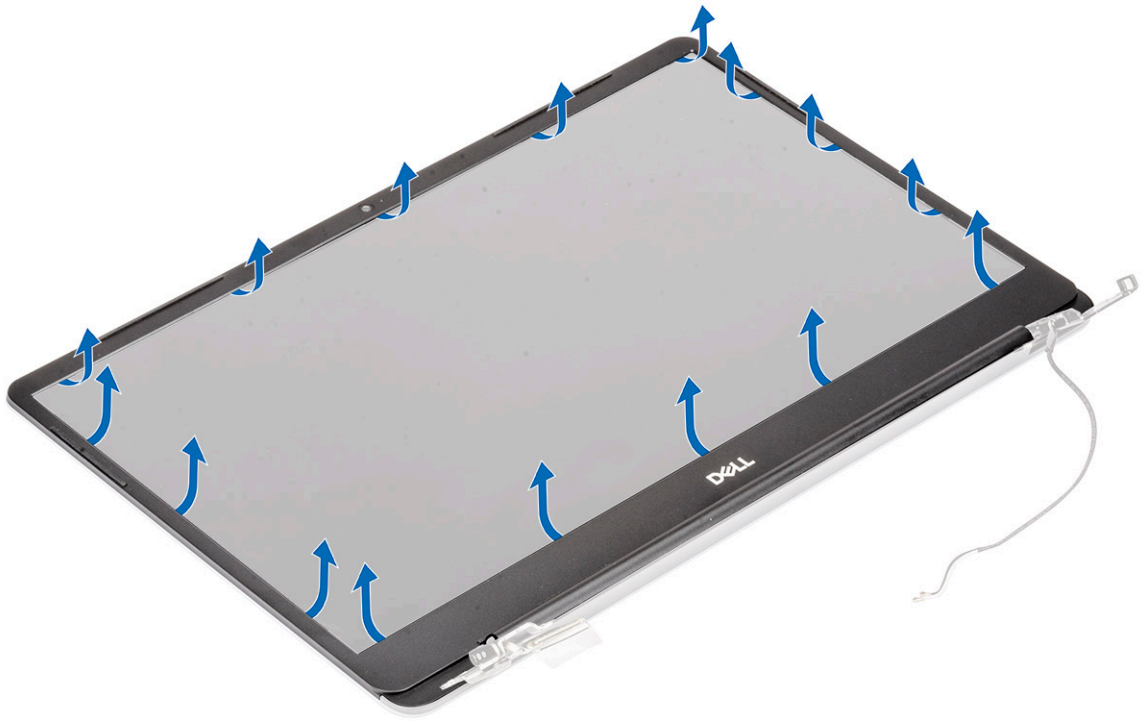3 Follow the procedure in After working inside your computer.

Display panel

Removing the display panel

1 Follow the procedure in Before working inside your computer.
2 Remove the:
    a base cover
    b battery
    c WLAN
    d display assembly
    e display bezel
3 To remove display panel:
    a Remove the 2 (M2x3) and 8 (M2x2.5) screws that secure the display panel to the display assembly [1, 2].
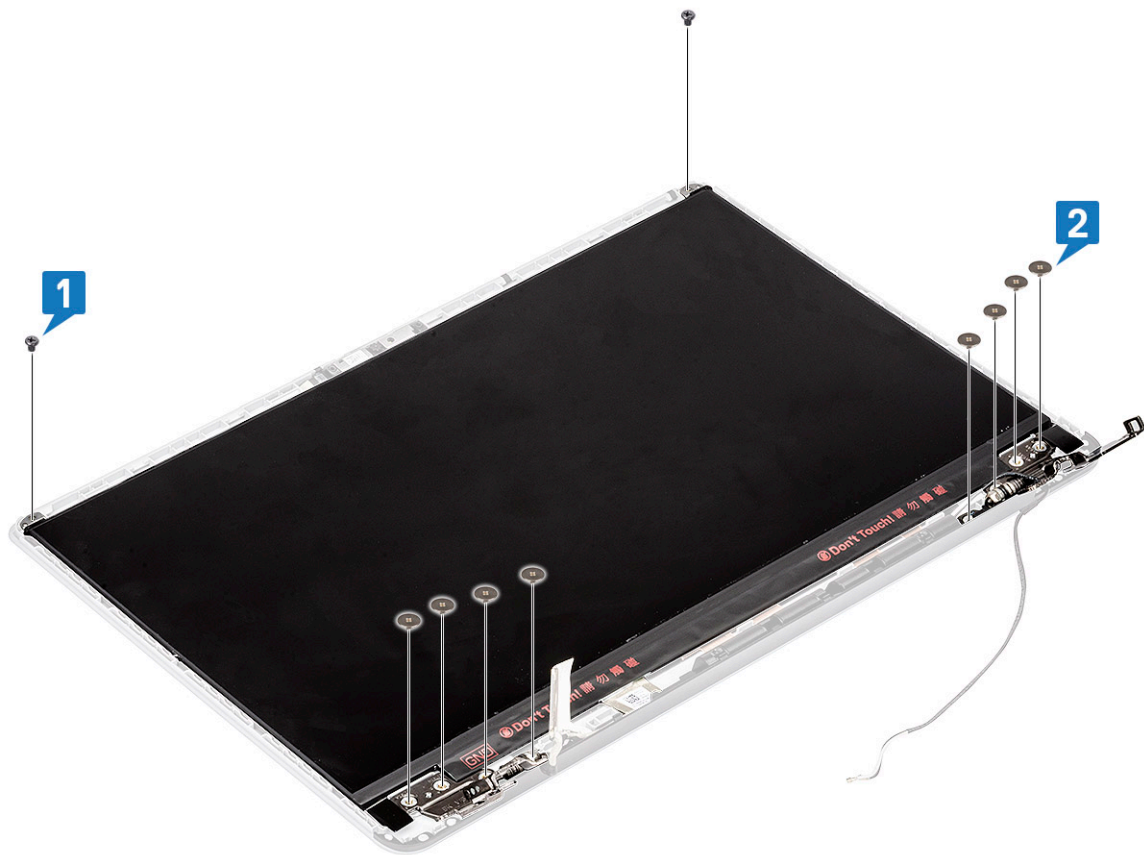
    b Release the display panel from the latches on both sides [1].
    c Turn over the display panel [2].
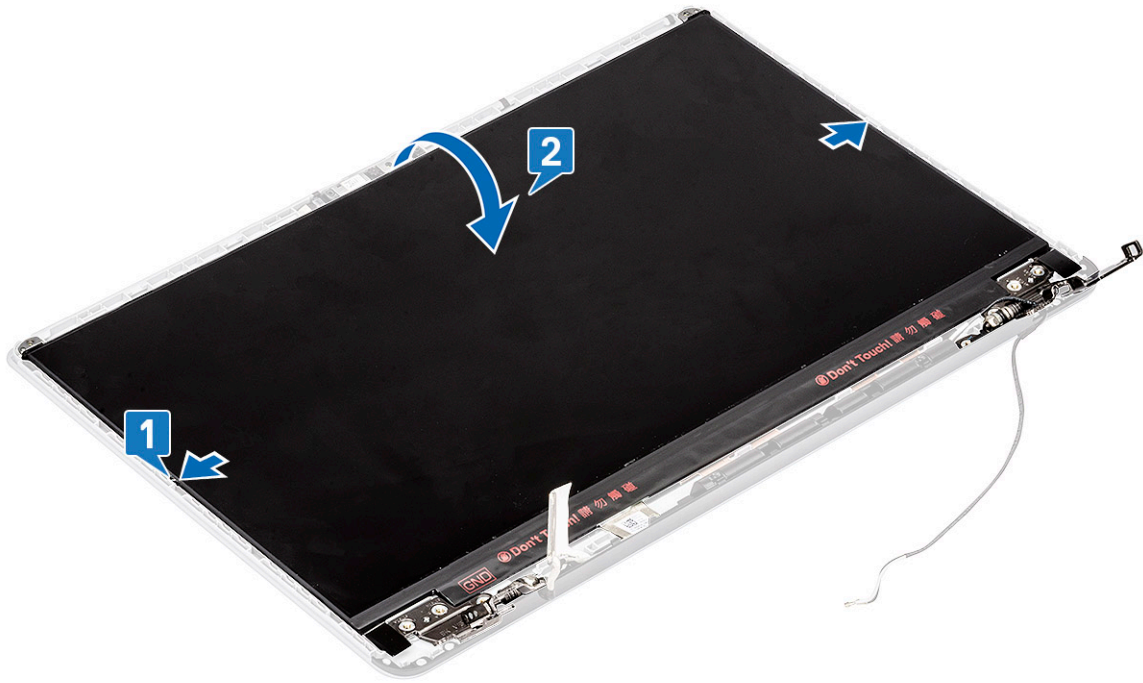
d   Peel the adhesive tape that secures the display cable connector to the display panel [1].
e   Release the latch and disconnect the display cable from the connector on the display panel [2, 3].

f   Remove the display panel.

Installing the display panel

1 To install the display panel:

    a   Connect the display cable to the connector on the back of the display panel and close the latch [1, 2].

    b   Affix the adhesive tape to secure the display cable to the display panel [3]
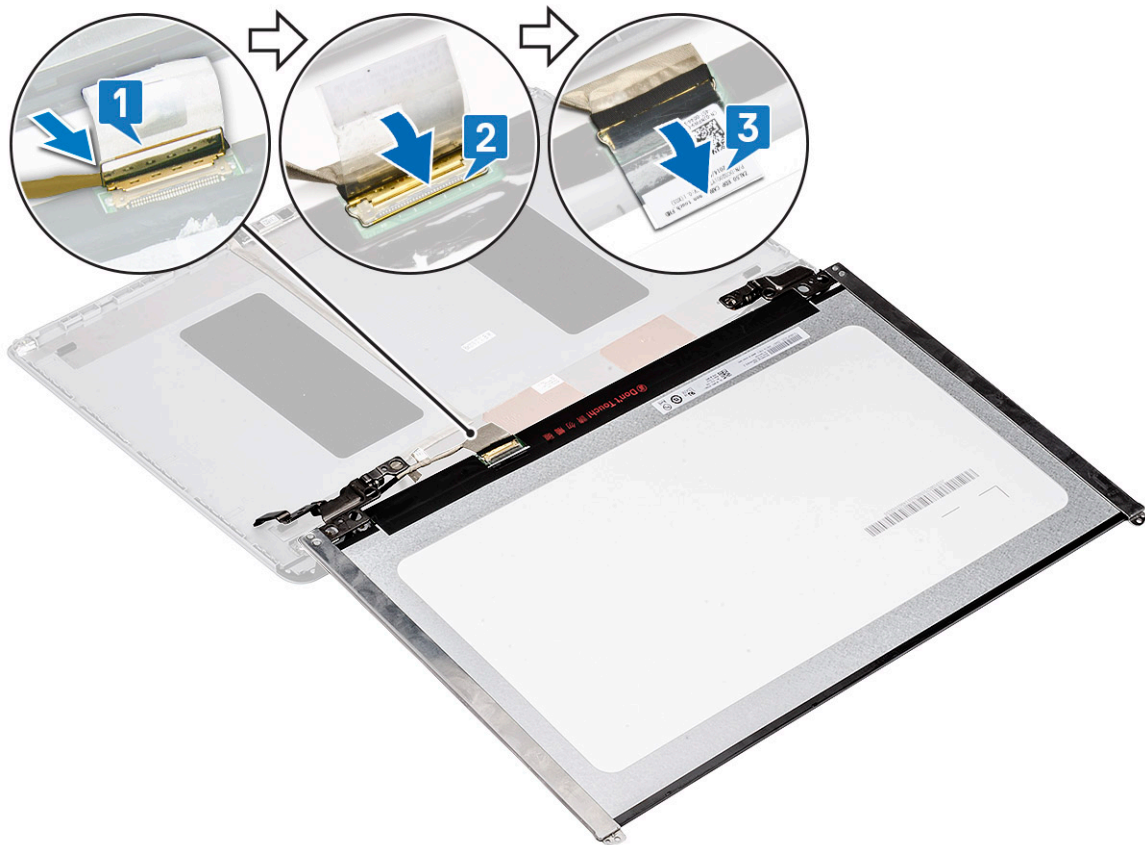
c   Flip back the display panel to the display assembly [1].

d   Close the latches on both sides of the display assembly to secure the display panel [2].
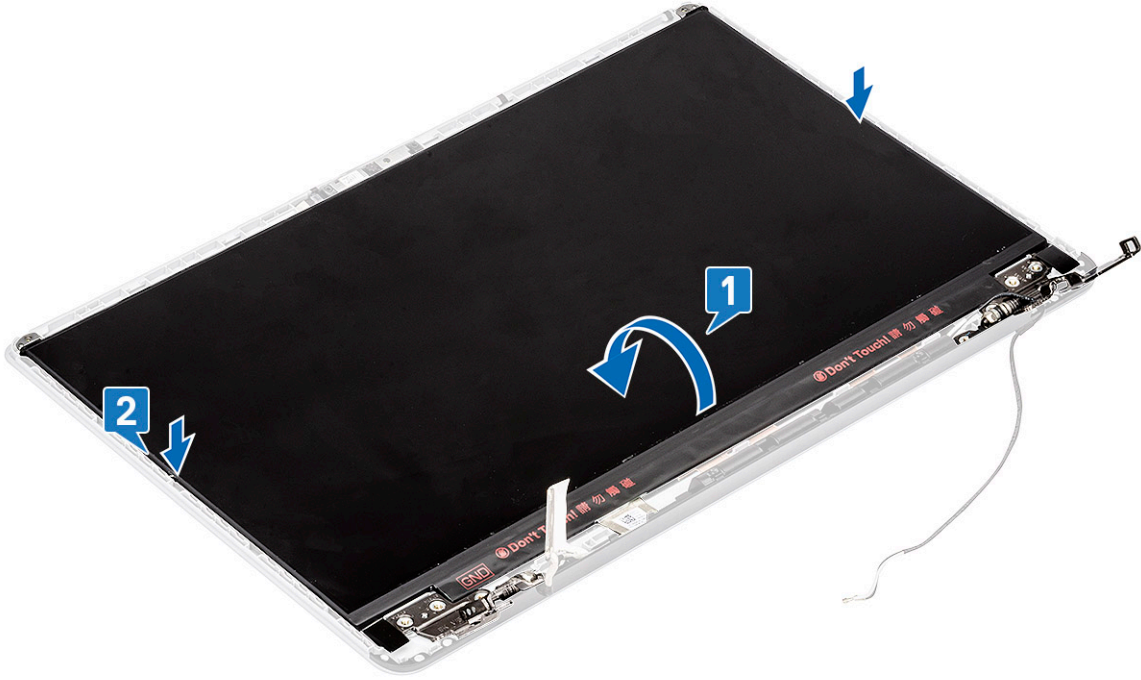
e   Replace the 2 (M2x3) and 8 (M2x2.5) screws to secure the display panel to the display assembly [1, 2].
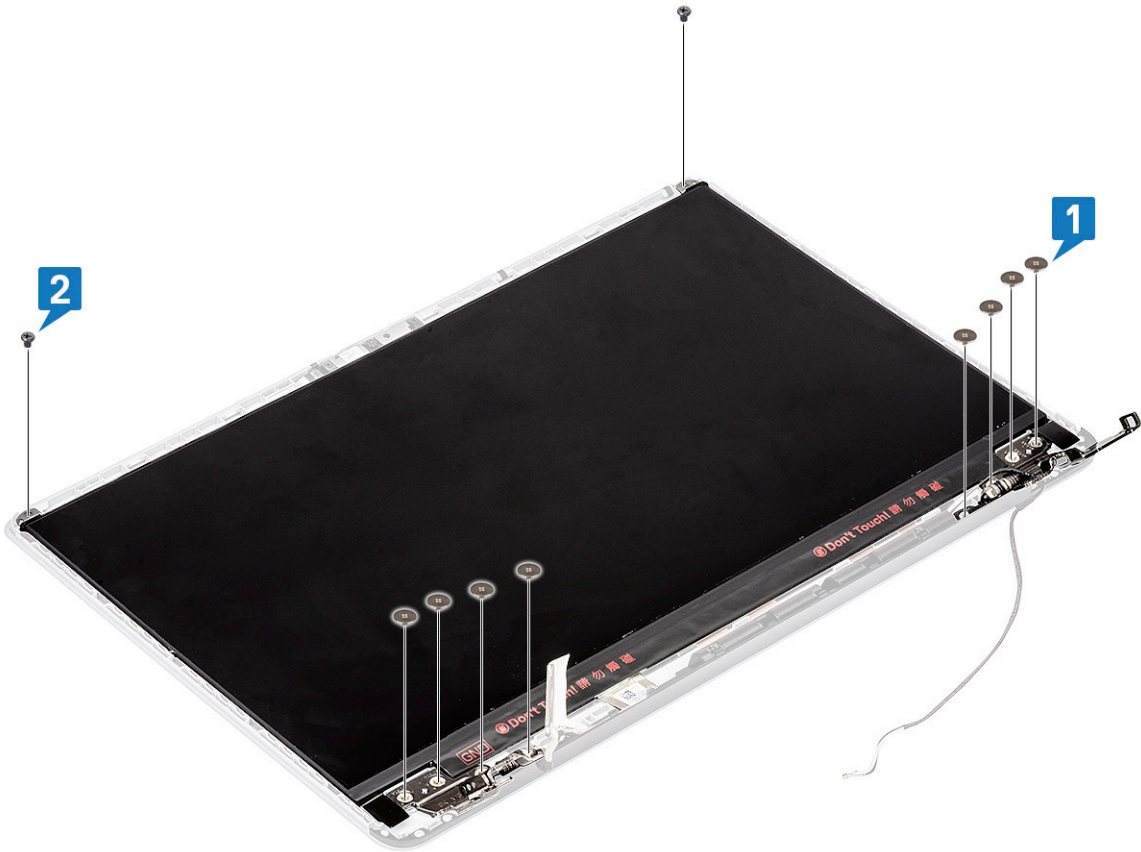
2   Install the:

a   display bezel

b   display assembly

c   WLAN

d   battery

e   base cover

3   Follow the procedure in After working inside your computer.

Camera

Removing the camera

1   Follow the procedure in Before working inside your computer.

2   Remove the:

a   base cover

b   battery

c   WLAN

d   display assembly

e   display bezel

f   display panel

3   To remove camera:

a   Peel the adhesive tape that covers the display cable connector and disconnect the display cable from the camera module [1].

b   Carefully pry the camera module from the display back cover [2].

Installing the camera

1   To install the camera:

a   Place the camera module in its slot on the system [1].

b   Connect the display cable to the camera module and affix the adhesive tape to secure the display cable connector [2].
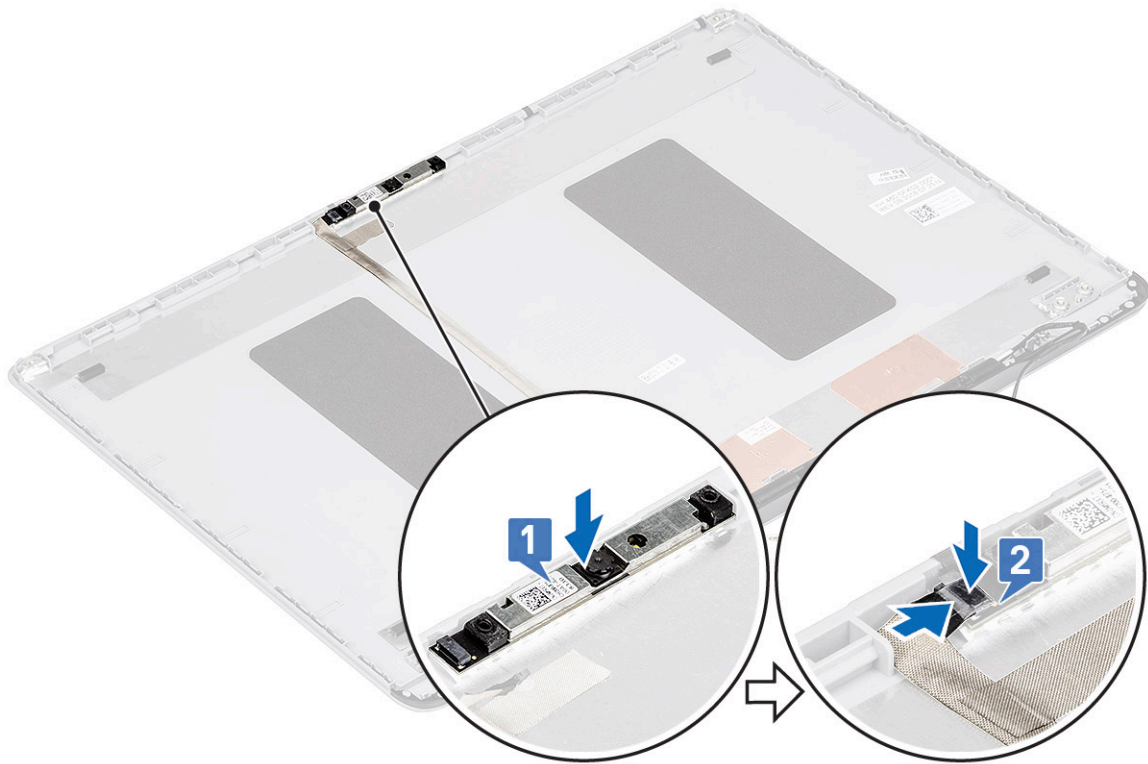
2   Install the:
   a   display panel
   b   display bezel
   c   display assembly
   d   WLAN
   e   battery
   f   base cover
3   Follow the procedure in After working inside your computer.
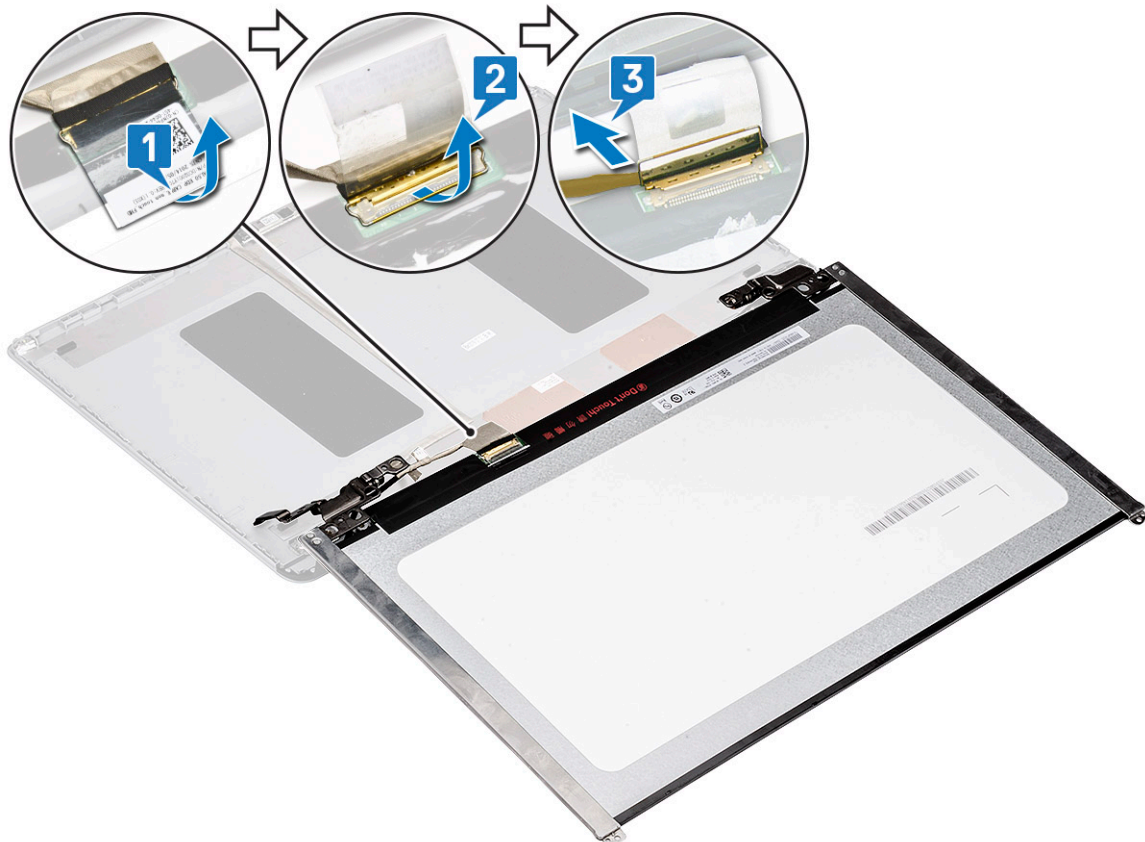
Display cable

Removing the display cable

1   Follow the procedure in Before working inside your computer.
2   Remove the:
   a   base cover
   b   battery
   c   WLAN
   d   display assembly
   e   display bezel
   f   display panel
   g   camera
3   To remove the display cable:
   a   Peel the display cable from the display back cover and unroute the cable from the routing channel.
   b   Remove the display cable from the display back cover.
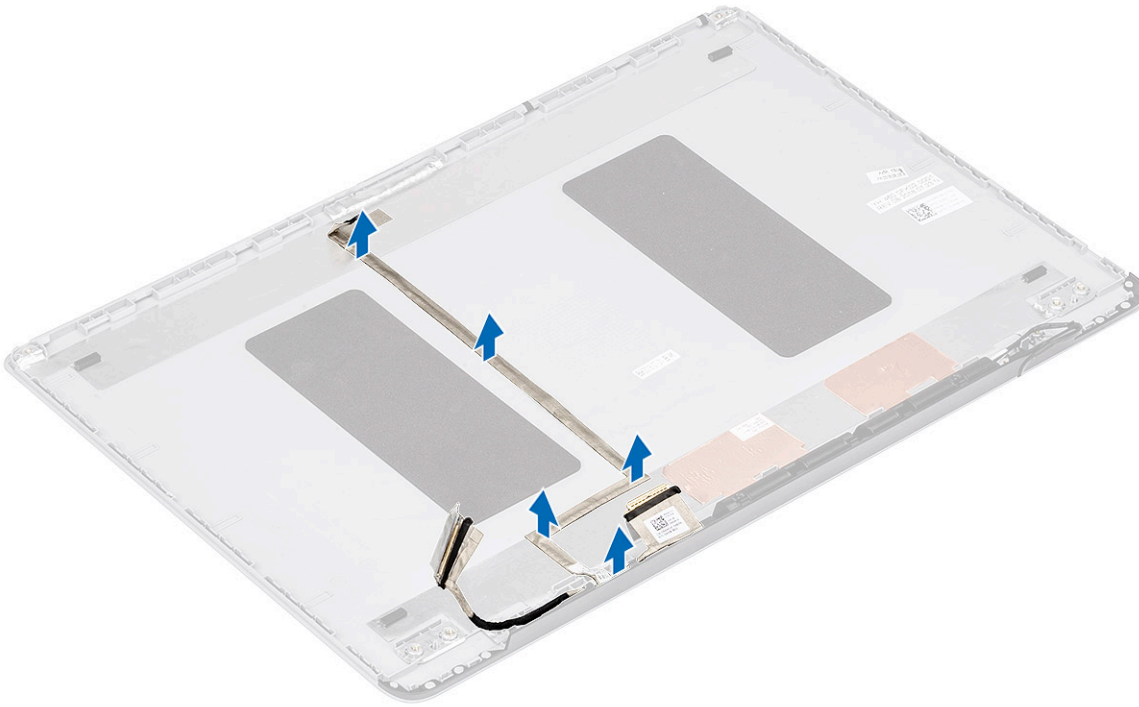
Installing the display cable

1 To install display cable:
   a Route and affix the display cable on the display back cover.
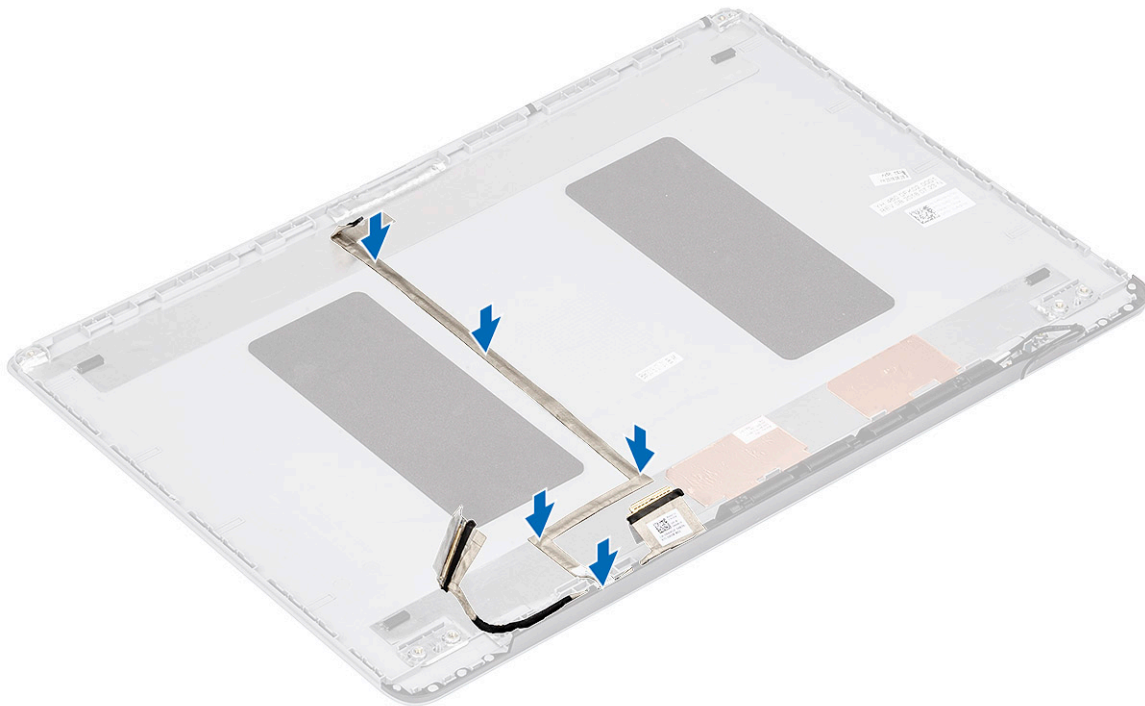
2 Install the:
   a camera
   b display panel

    c   display bezel

    d   display assembly

    e   WLAN

    f   battery

    g   base cover

3   Follow the procedure in After working inside your computer.

Display back cover

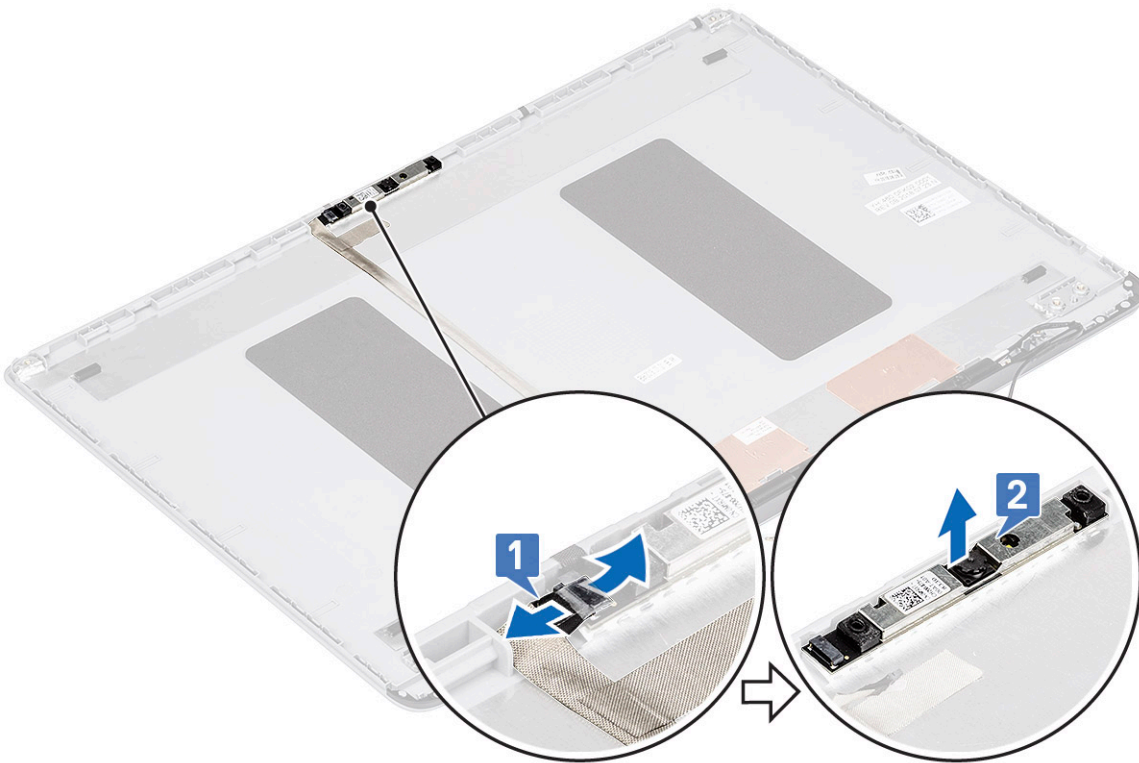## Removing the display back cover

1   Follow the procedure in Before working inside your computer.

2   Remove the:

    a   base cover

    b   battery

    c   WLAN

    d   display assembly

    e   display bezel

    f   display panel

    g   camera

    h   display cable

3   After removing the above components, we are left with the display back cover.
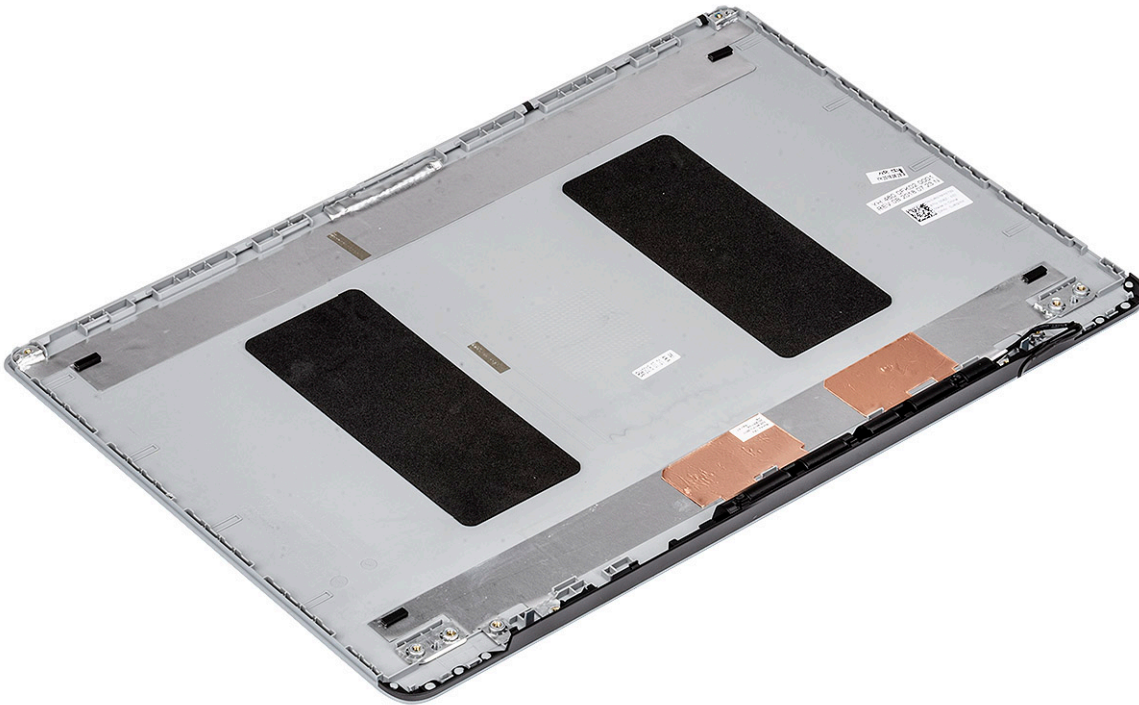
Troubleshooting

Enhanced Pre-Boot System Assessment — ePSA diagnostics

The ePSA diagnostics (also known as system diagnostics) performs a complete check of your hardware. The ePSA is embedded with the BIOS and is launched by the BIOS internally. The embedded system diagnostics provides a set of options for particular devices or device groups allowing you to:

- Run tests automatically or in an interactive mode
- Repeat tests
- Display or save test results
- Run thorough tests to introduce additional test options to provide extra information about the failed device(s)
- View status messages that inform you if tests are completed successfully
- View error messages that inform you of problems encountered during testing

⚠ **CAUTION: Use the system diagnostics to test only your computer. Using this program with other computers may cause invalid results or error messages.**

ⓘ **NOTE: Some tests for specific devices require user interaction. Always ensure that you are present at the computer terminal when the diagnostic tests are performed.**

Running the ePSA Diagnostics

Invoke diagnostics boot by either of the methods that are suggested below:

1. Power on the computer.
2. As the computer boots, press the F12 key when the Dell logo is displayed.
3. In the boot menu screen, use Up/Down arrow key to select the **Diagnostics** option and then press **Enter**.

   ⓘ **NOTE: The Enhanced Pre-boot System Assessment window displays, listing all devices detected in the computer. The diagnostics starts running the tests on all the detected devices.**

4. Press the arrow in the lower-right corner to go to the page listing.

   The detected items are listed and tested.

5. To run a diagnostic test on a specific device, press Esc and click **Yes** to stop the diagnostic test.
6. Select the device from the left pane and click **Run Tests**.
7. If there are any issues, error codes are displayed.

   Note the error code and contact Dell.

   or

8. Shut down the computer.
9. Press and hold the Fn key, while pressing the power button, and then release both.
10. Repeat steps 3–7 above.

Diagnostic LED

This section details the diagnostic features of the battery LED in a notebook.

Instead of beep codes errors are indicated via the bicolor Battery Charge LED. A specific blink pattern is followed by flashing a pattern of flashes in amber, followed by white. The pattern then repeats.

> (i) **NOTE: The diagnostic pattern will consist of a two digit number being represented by a first group of LED blinks (1 through 9) in amber, followed by a 1.5 second pause with the LED off, and then a second group of LED blinks (1 through 9) in white. This is then followed by a three second pause, with the LED off, before repeating over again. Each LED blink takes 0.5 seconds.**

The system will not shutdown when displaying the Diagnostic Error Codes. Diagnostic Error Codes will always supersede any other use of the LED. For instance, on Notebooks, battery codes for Low Battery or Battery Failure situations will not be displayed when Diagnostic Error Codes are being displayed:

Table 6. LED pattern

Blinking pattern		Problem Description	Suggested Resolution
Amber	White		
2	1	processor	processor failure
2	2	system board, BIOS ROM	system board, covers BIOS corruption or ROM error
2	3	memory	no memory/no RAM detected
2	4	memory	memory failure/RAM failure
2	5	memory	invalid memory installed
2	6	system board; chipset	system board/ chipset error
2	7	display	display failure
3	1	RTC power failure	coin-cell battery failure
3	2	PCI/Video	PCI/Video card/chip failure
3	3	BIOS recovery 1	recovery image nor found
3	4	BIOS recovery 2	recovery image found but invalid

Battery status lights

If the computer is connected to an electrical outlet, the battery light operates as follows:

Alternately blinking amber light and white light	An unauthenticated or unsupported non-Dell AC adapter is attached to your laptop. Re-plug battery connector, replace battery if the issue reoccurs.
Alternately blinking amber light with steady white light	Temporary battery failure with AC adapter present. Re-plug battery connector, replace battery if the issue reoccurs.
Constantly blinking amber light	Fatal battery failure with AC adapter present. Fetal battery, replace the battery.
Light off	Battery in full charge mode with AC adapter present.
White light on	Battery in charge mode with AC adapter present.

Getting help

Contacting Dell

ⓘ **NOTE: If you do not have an active Internet connection, you can find contact information on your purchase invoice, packing slip, bill, or Dell product catalog.**

Dell provides several online and telephone-based support and service options. Availability varies by country and product, and some services may not be available in your area. To contact Dell for sales, technical support, or customer service issues:

1 Go to **Dell.com/support.**
2 Select your support category.
3 Verify your country or region in the **Choose a Country/Region** drop-down list at the bottom of the page.
4 Select the appropriate service or support link based on your need.