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1.

The screenshot shows a Moodle course page for '1112\_F723500' on the left, titled 'INTRODUCTION TO WORK'. The right side displays a Wireshark network traffic capture. The packet list shows a series of SSDP and UDP packets. The selected packet (No. 46) is a User Datagram Protocol (UDP) packet with the following details:

Field	Value
Source Port	57621
Destination Port	57621
Length	52
Checksum	0x8b2b [unverified]

4 field( source port 、 destination port 、 length 、 checksum)

2.

The screenshot shows a Moodle course page for '1112\_電腦網路概論 INTRODUCTION TO COMPUTER NETWORK' on the left. The right side displays a Wireshark network traffic capture. The selected packet (No. 46) is a User Datagram Protocol (UDP) packet with the following details:

Field	Value
Source Port (only source port, 2 bytes)	57621
Destination Port	57621
Length	52
Checksum	0x8b2b [unverified]

Source port: 2 bytes

1112\_電腦網路概論 INTRODUCTION TO COMPUTER NETWORK

作業

- Homework 1 (Deadline: 2023/03/23 23:59)
- Homework 2 (Deadline: 2023/04/02 23:59)
- Homework 3 (Deadline: 2023/05/10 23:59)

請下載附件並仔細閱讀，按照內容指示完成作業。

繳交作業時，務必按照以下幾點規定：

- 本次作業要求繳交 pdf 檔案，請將題號標示清楚（不須複製題目），無標示題號者該題零分。

Wireshark Packet List:

No.	Time	Source	Destination	Protocol	Length	Info
1647	90.606431	140.116.107.12	239.255.255.258	SSDP	211	M-SEARCH *
1648	90.685465	140.116.107.12	239.255.255.258	SSDP	217	M-SEARCH *
1655	91.456318	140.116.107.25	239.255.255.258	SSDP	217	M-SEARCH *
1680	94.286349	140.116.107.81	239.255.255.258	SSDP	167	M-SEARCH *
46	3.012775	140.116.107.15	140.116.107.255	UDP	86	57621 → 576
126	9.382920	140.116.107.12	140.116.107.255	UDP	86	57621 → 576
297	22.398148	140.116.107.81	140.116.107.255	UDP	86	57621 → 576
920	46.937723	140.116.107.15	140.116.107.255	UDP	86	57621 → 576
1010	53.300720	140.116.107.12	140.116.107.255	UDP	86	57621 → 576
1309	66.312184	140.116.107.81	140.116.107.255	UDP	86	57621 → 576
1650	90.860941	140.116.107.15	140.116.107.255	UDP	86	57621 → 576

Packet Details:

```

Frame 46: 86 bytes on wire (688 bits), 86 bytes captured (688 bits) on interface vde
  Ethernet II, Src: LcFCHefe_a7:e5:ec (e8:6a:64:a7:e5:ec), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
  Internet Protocol Version 4, Src: 140.116.107.15, Dst: 140.116.107.255
  User Datagram Protocol, Src Port: 57621, Dst Port: 57621
    Source Port: 57621
    Destination Port: 57621
    Length: 52
    Checksum: 0x8b2b [unverified]
    [Checksum Status: Unverified]
    [Stream Index: 4]
    [Timestamps]
    UDP payload (44 bytes)
    Data (44 bytes)
  
```

Destination port: 2 bytes

1112\_電腦網路概論 INTRODUCTION TO COMPUTER NETWORK

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請下載附件並仔細閱讀，按照內容指示完成作業。

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- 本次作業要求繳交 pdf 檔案，請將題號標示清楚（不須複製題目），無標示題號者該題零分。

Wireshark Packet List:

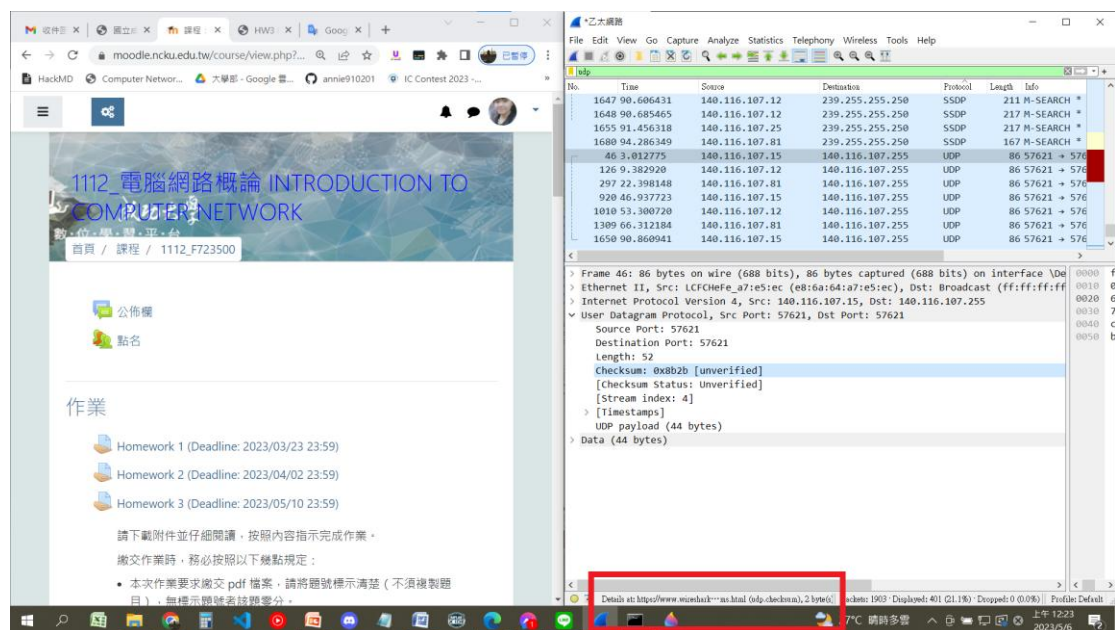
No.	Time	Source	Destination	Protocol	Length	Info
1647	90.606431	140.116.107.12	239.255.255.258	SSDP	211	M-SEARCH *
1648	90.685465	140.116.107.12	239.255.255.258	SSDP	217	M-SEARCH *
1655	91.456318	140.116.107.25	239.255.255.258	SSDP	217	M-SEARCH *
1680	94.286349	140.116.107.81	239.255.255.258	SSDP	167	M-SEARCH *
46	3.012775	140.116.107.15	140.116.107.255	UDP	86	57621 → 576
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297	22.398148	140.116.107.81	140.116.107.255	UDP	86	57621 → 576
920	46.937723	140.116.107.15	140.116.107.255	UDP	86	57621 → 576
1010	53.300720	140.116.107.12	140.116.107.255	UDP	86	57621 → 576
1309	66.312184	140.116.107.81	140.116.107.255	UDP	86	57621 → 576
1650	90.860941	140.116.107.15	140.116.107.255	UDP	86	57621 → 576

Packet Details:

```

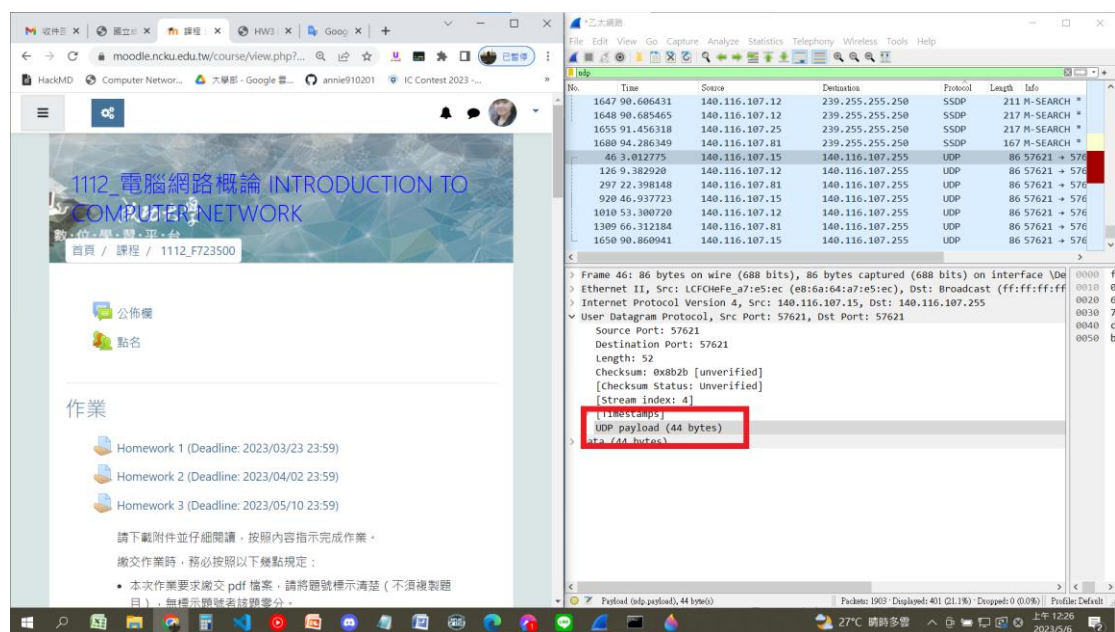
Frame 46: 86 bytes on wire (688 bits), 86 bytes captured (688 bits) on interface vde
  Ethernet II, Src: LcFCHefe_a7:e5:ec (e8:6a:64:a7:e5:ec), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
  Internet Protocol Version 4, Src: 140.116.107.15, Dst: 140.116.107.255
  User Datagram Protocol, Src Port: 57621, Dst Port: 57621
    Source Port: 57621
    Destination Port: 57621
    Length: 52
    Checksum: 0x8b2b [unverified]
    [Checksum Status: Unverified]
    [Stream Index: 4]
    [Timestamps]
    UDP payload (44 bytes)
    Data (44 bytes)
  
```

Length: 2 bytes



Checksum: 2 bytes

3.



UDP packet 的 payload 是 44 bytes，加上 header 也就是 source port、destination port、length、checksum 的  $2 \times 4\text{bytes}$  一共是 52bytes，剛好可以跟 length 的 52 對上

所以 The value in the Length field is the length of **header + payload**

4.

由第二題，Length = 2 bytes，又 1byte = 8bit，所以一共是 16bits

$$2^{16} - 1 = 65535$$

$$65535 - 8(\text{header}) = 65527$$

所以 maximum number of bytes that can be included in a UDP payload = **65527 bytes**



5.

由第二題，Source port = 2 bytes = 16bits

所以 largest possible source port number =  $2^{16}-1 = 65535$

6.

The screenshot shows a Moodle course page on the left and a Wireshark packet capture analysis on the right. The Moodle page is titled "1112\_電腦網路概論 INTRODUCTION TO COMPUTER NETWORK" and lists three homework assignments with deadlines. The Wireshark window displays a packet list and a detailed view of a selected packet.

**Packet List:**

No.	Time	Source	Destination	Protocol	Length	Info
1647	90.606431	140.116.107.12	239.255.255.250	SSDP	211	M-SEARCH *
1648	90.685465	140.116.107.12	239.255.255.250	SSDP	217	M-SEARCH *
1655	91.456318	140.116.107.25	239.255.255.250	SSDP	217	M-SEARCH *
1680	94.286349	140.116.107.81	239.255.255.250	SSDP	167	M-SEARCH *
46	3.012775	140.116.107.15	140.116.107.255	UDP	86	57621 → 576
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1650	90.860941	140.116.107.15	140.116.107.255	UDP	86	57621 → 576

**Detailed View of Frame 46:**

- Frame 46: 86 bytes on wire (688 bits), 86 bytes captured (688 bits) on interface \...
- Ethernet II, Src: LcFCheFe\_a7:e5:ec (e8:6a:04:a7:e5:ec), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
- Internet Protocol Version 4, Src: 140.116.107.15, Dst: 140.116.107.255
  - 0100 .... = Version: 4
  - .... 0101 = Header Length: 20 bytes (5)
  - Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
  - Total Length: 72
  - Identification: 0xd005 (53253)
  - 000. .... = Flags: 0x0
  - 0.0000.0000.0000 = Fragment Offset: 0
  - Time to Live: 128
  - Protocol: UDP (17)
  - Header checksum: 0x7a08 [validation disabled]
  - [Header checksum status: Unverified]
  - Source Address: 140.116.107.15
  - Destination Address: 140.116.107.255
- User Datagram Protocol, Src Port: 57621, Dst Port: 57621
  - Source Port: 57621
  - Destination Port: 57621
  - Length: 52
  - Checksum: 0xab2b [unverified]
  - [Checksum Status: Unverified]
  - [Stream index: 41]

the protocol number for UDP = 17