

# Tutorial for Chapter 3

Network Management Standards, Models and Language

NET 311 – Computer Network Management

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## Problem 1

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Write an ASN. 1 module that specifies course as SEQUENCE type. The course consists of program code (IA5String 3 to 4 letters), number (INTEGER between 100 and 9999) and a course name (UTF8String). Write the ASN. 1 description:

- a. for the structure (Type definition)
- b. for the value, using the course:

| Program code | Course number | Course Name                 |
|--------------|---------------|-----------------------------|
| NET          | 311           | Computer Network Management |

## Solution

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a.

```
Course-Module DEFINITIONS ::=
BEGIN
```

```
Course ::= SEQUENCE {
    programCode  IA5String (SIZE (3 .. 4)),
    courseNumber INTEGER (100 .. 9999),
    courseName   UTF8String
}
```

```
END
```

b.

```
net-mgmt Course ::= {  
  programCode "NET",  
  courseNumber 311,  
  courseName "Computer Network Management"  
}
```

## Problem 2

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Using the type definition:

`Small-Number ::= INTEGER (0 .. 9999)`

Encode the following:

`numOfStudents Small-Number ::= 750`

The codes of the types used:

| Type    | Tag (hex) |
|---------|-----------|
| INTEGER | 02        |

## Solution

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| Type    | Length  | Value |
|---------|---------|-------|
| INTEGER | 2 bytes | 750   |
| 02      | 02      | 02EE  |

Final Answer:

02 02 02 EE

## Problem 3

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Using the type definition:

```
Student-Name ::= UTF8String (SIZE (2 .. 255))
```

Encode the following:

```
student1 Student-Name ::= "Saad"
```

The codes of the types used:

| Type       | Tag (hex) |
|------------|-----------|
| UTF8String | 0C        |

The ASCII codes of the letters:

| Letter | Hex Code |
|--------|----------|
| A      | 41       |
| B      | 42       |
| C      | 43       |
| D      | 44       |
| E      | 45       |
| F      | 46       |
| G      | 47       |
| H      | 48       |
| I      | 49       |
| J      | 4A       |
| K      | 4B       |
| L      | 4C       |
| M      | 4D       |

| Letter | Hex Code |
|--------|----------|
| N      | 4E       |
| O      | 4F       |
| P      | 50       |
| Q      | 51       |
| R      | 52       |
| S      | 53       |
| T      | 54       |
| U      | 55       |
| V      | 56       |
| W      | 57       |
| X      | 58       |
| Y      | 59       |
| Z      | 5A       |

| Letter | Hex Code |
|--------|----------|
| a      | 61       |
| b      | 62       |
| c      | 63       |
| d      | 64       |
| e      | 65       |
| f      | 66       |
| g      | 67       |
| h      | 68       |
| i      | 69       |
| j      | 6A       |
| k      | 6B       |
| l      | 6C       |
| m      | 6D       |

| Letter | Hex Code |
|--------|----------|
| n      | 6E       |
| o      | 6F       |
| p      | 70       |
| q      | 71       |
| r      | 72       |
| s      | 73       |
| t      | 74       |
| u      | 75       |
| v      | 76       |
| w      | 77       |
| x      | 78       |
| y      | 79       |
| z      | 7A       |



## Solution

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| Type       | Length               | Value           |
|------------|----------------------|-----------------|
| UTF8String | 4 bytes (characters) | 'S' 'a' 'a' 'd' |
| 0C         | 04                   | 53 61 61 64     |

Final Answer:

0C 04 53 61 61 64

## Problem 4

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Using the type definition:

```
Tcp-Connection ::= SEQUENCE {  
    netAddress OCTET STRING (SIZE (4)),  
    portNumber INTEGER (0 .. 65535)  
}
```

Encode the following:

```
connection1 Tcp-Connection ::= {  
    netAddress '0A0A0A0A'H  
    portNumber 5000  
}
```

The codes of the types used:

| Type         | Tag (hex) |
|--------------|-----------|
| SEQUENCE     | 30        |
| OCTET STRING | 04        |
| INTEGER      | 02        |

## Solution

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| Type     | Length         | Value           |         |                         |         |         |                 |
|----------|----------------|-----------------|---------|-------------------------|---------|---------|-----------------|
| SEQUENCE | Count<br>bytes |                 |         |                         |         |         |                 |
|          |                | Type            | Length  | Value                   | Type    | Length  | Value           |
|          | 10<br>bytes    | OCTET<br>STRING | 4 bytes | Hexadecimal<br>0A0A0A0A | INTEGER | 2 bytes | Decimal<br>5000 |
| 30       | 0A             | 04              | 04      | 0A0A0A0A                | 02      | 02      | 1388            |

Final Answer:

30 0A 04 04 0A 0A 0A 0A 02 02 13 88

## Useful Links

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<http://www.obj-sys.com/asn1tutorial/node7.html>

<http://www.obj-sys.com/asn1tutorial/node8.html>

<http://www.obj-sys.com/asn1tutorial/node18.html>

<http://luca.ntop.org/Teaching/Appunti/asn1.html>

<http://asn1-playground.oss.com>