Toolbox I2SI Interoperability / Modelling System
Mines Saint-Étienne / Master CPS²
2018-2019

Exam (1h00)

LAST NAME : ………………………………………….…………….…………….……….……..

FISRT NAME : …………………….…………..…….………….…….………….………….

Remember to write your name on the first page and write you initials on the other pages. Write your answers directly on the exam sheets. Documents are not allowwed. Computers and electronic devices (included mobile phones) are not allowed.

Exercice 1

Describe this document: what is the separator, the escape character, how many rows there are including the header, how many columns?

```
1    Lead,Title,Phone,Notes
2    Jim Grayson,Senior Manager,(555)761-2385,"Spoke Tuesday,
3    Tom and Harry, Well, are, interested"
4    Prescilla Winston,Development Director,(555)218-3981,"said to call
     again ""some day"""
5    Melissa Potter,Head of Accounts,(555)791-3471,"Not interested, gave
     referral"
```

Exercice 2

Mary bought 200 g of meat for 5 €, 1 kg sugar for 1 €, 12 eggs for 3 €.

Represent this information using XML. You can chose whatever schema is appropriate to model this kind of information in general.

Exercice 3

Consider the following JSONSChema:

```
1     {
2       "id":
3     "http://openinterconnect.org/schemas/oic.r.airquality.json#",
4       "$schema": "http://json-schema.org/draft-04/schema#",
5       "description" : "Copyright (c) 2017 Open Connectivity
      Foundation, Inc. All rights reserved.",
6       "title": "Air Quality",
7       "definitions": {
8         "oic.r.airquality": {
9           "type": "object",
10          "properties": {
11            "contaminantvalue": {
12              "type": "integer",
13              "readOnly": true,
14              "description": "The measured or qualitative value for
      the contaminant."
15            },
16            "contaminanttype": {
17              "type": "string",
18              "enum":
      "CH2O","CO2","CO","PM1","PM2.5","PM10","VOC","Smoke","Odor","AirPo
      llution"],
19              "description": "The contaminant being measured.",
20              "readOnly": true
21            },
22            "valuetype": {
23              "type": "string",
24              "enum": ["Qualitative","Measured"],
25              "description": "Indicates whether the provided value is
      qualitative or measured.",
26              "readOnly": true
27            }
28          }
29        }
30      },
31      "type": "object",
32      "allOf": [
33        {"$ref":
      "oic.baseResource.json#/definitions/oic.r.baseresource"},
34        {"$ref": "#/definitions/oic.r.airquality"}
35      ],
36      "required":
      ["contaminantvalue","contaminanttype","valuetype","range"]
37    }
```

The following document is not valid with respect to the previous schema. Explain what the error(s) is(are) and propose a corrected document.

```
1     {
2       "rt": "oic.r.airquality",
3       "id": "sensor2",
4       "contaminanttype": "CO"
5       "contaminantvalue": 10,
6       range: [0,500]
7     }
```

Exercice 4

The headers of a HTTP request contains:

`Accept: text/html,application/xhtml+xml,application/json;q=0.7,text/*;q=0.2`

Describe this line.

The headers of the corresponding HTTP response contains:

`Content-Type: text/html;charset=UTF-8`

Describe this line.

Where can you find the list of the registered values that `Content-Type` may take?

Exercice 5

Why may it be useful for a single company to define JSONSchemas for the documents they manipulate?

Explain why JSON, JSONSchema, Graph models, provide answers to different sub-problems of the more general problem of data interoperability. Answers that show the key points **concisely** will be most valued.

- **Exercice 6**

Model as a graph, as seen in the course of modelling knowledge, the following situation :

> Danny is a man, born the 13th of March, 1975 in Bordeaux, France. He likes the song *Smell Like Teen Spirit* by Nirvana. On the 10th of February, 1994, Danny and his friend Olga, went to *Le Palais des Sports* in Toulouse to see Nirvana playing there. Danny thought the performance was excellent, but Olga disagreed.