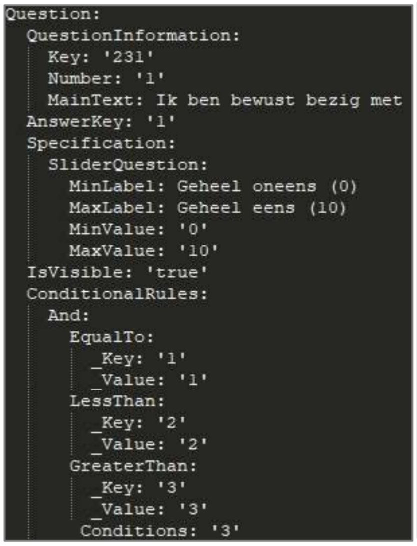
at most pseudo-code, source code does not add to the report

What is the best way to format the survey specifications?

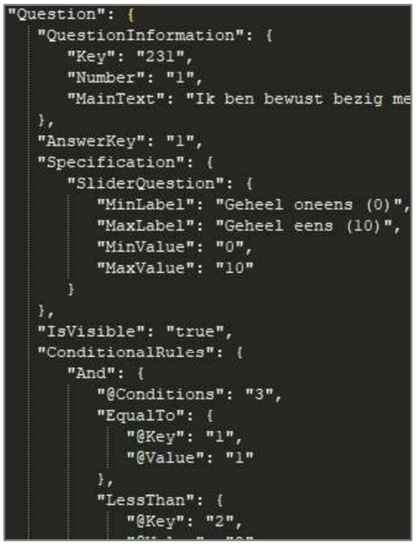
The assignment description mentioned that a new format would be preferable to the current way of making survey specifications, which is through code. This new format would be used to write the survey specifications by hand in a text editor, or in the future using a tool specifically made for that purpose. The new format can also always be converted to a different format if needed, giving a lot more flexibility regarding the creation of survey specifications.

XML, JSON and YAML were given as possible options for the new format, so these are the ones that were researched. There are other possible options too, but the developers preferred if one of these three was picked. Especially YAML or XML.



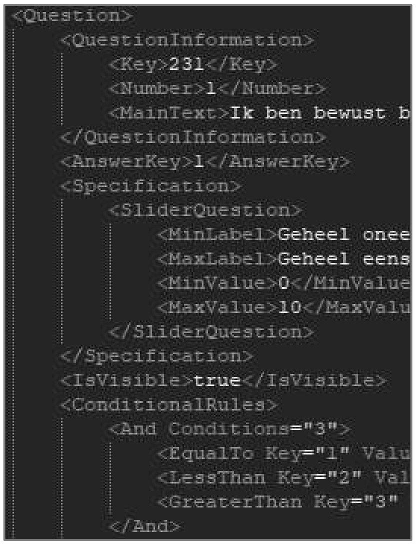
```
Question:
  QuestionInformation:
    Key: '231'
    Number: '1'
    MainText: Ik ben bewust bezig met
  AnswerKey: '1'
  Specification:
    SliderQuestion:
      MinLabel: Geheel oneens (0)
      MaxLabel: Geheel eens (10)
      MinValue: '0'
      MaxValue: '10'
  IsVisible: 'true'
  ConditionalRules:
    And:
      EqualTo:
        _Key: '1'
        _Value: '1'
      LessThan:
        _Key: '2'
        _Value: '2'
      GreaterThan:
        _Key: '3'
        _Value: '3'
       Conditions: '3'
```

FIGURE 5 YAML EXAMPLE



```
"Question": {
   "QuestionInformation": {
      "Key": "231",
      "Number": "1",
      "MainText": "Ik ben bewust bezig me
   },
   "AnswerKey": "1",
   "Specification": {
      "SliderQuestion": {
         "MinLabel": "Geheel oneens (0)",
         "MaxLabel": "Geheel eens (10)",
         "MinValue": "0",
         "MaxValue": "10"
      }
   },
   "IsVisible": "true",
   "ConditionalRules": {
      "And": {
         "@Conditions": "3",
         "EqualTo": {
            "@Key": "1",
            "@Value": "1"
         },
         "LessThan": {
            "@Key": "2",
```

FIGURE 4 JSON EXAMPLE



```
<Question>
    <QuestionInformation>
        <Key>231</Key>
        <Number>1</Number>
        <MainText>Ik ben bewust b
    </QuestionInformation>
    <AnswerKey>1</AnswerKey>
    <Specification>
        <SliderQuestion>
            <MinLabel>Geheel onee
            <MaxLabel>Geheel eens
            <MinValue>0</MinValue
            <MaxValue>10</MaxValu
        </SliderQuestion>
    </Specification>
    <IsVisible>true</IsVisible>
    <ConditionalRules>
        <And Conditions="3">
            <EqualTo Key="1" Valu
            <LessThan Key="2" Val
            <GreaterThan Key="3"
        </And>
```

FIGURE 3 XML EXAMPLE

Table 2 shows a quick comparison between the three formats, a more in-depth comparison follows in the next few paragraphs.

Feature	**JSON**	**YAML**	**XML**
Explicitness	Explicit	Less explicit	Very explicit
Comments	Not supported	Supported	Supported
Simplicity	Fairly simple	Complex	Complex
Transformation	Not supported	Third-party YSLT tools	XSLT transformations
Attributes	Not supported	Not supported	Supported
.NET Core support	Official support	Third-party support	Official support
Documentation	Microsoft documentation	Third-party documentation	Microsoft documentation

TABLE 2 COMPARISON OF JSON, YAML AND XML

Since the new format will be handwritten by the developers, YAML is a good option. In figure 3 you can see that YAML uses the least amount of characters compared to JSON in figure 4, and XML in figure 5. Another benefit of YAML and XML is that they both support comments, unlike JSON. (Ben-Kiki, Evans, & Net, 2009)

JSON as a serialisation format is more explicit than YAML, but not as explicit as XML. This explicitness makes JSON and XML more suitable for serialisation and data interchange, both of which are of

COMPOSITE PATTERN EXPLANATION

The composite design pattern essentially describes a tree structure where each branch or leaf can be interchanged with another leaf. With leaves being objects in this case.

W3design describes it as

> "An inflexible way to represent a part-whole hierarchy is to define (1) Part objects and (2) Whole objects that act as containers for Part objects.
>
> Clients of the hierarchy must treat Part and Whole objects differently, which makes them more complex especially if the object structure is constructed and traversed dynamically." (w3sDesign, sd)

This pattern was used because it perfectly fits the situation, each condition has only slight differences, but they can all be used the same for the calculation of the visibility.

Validation

When a survey is loaded into the API it is validated to make sure it works correctly, for example to make sure the minimum value of a question isn't higher than its maximum value, or to make sure that a section doesn't contain zero questions.

A lot of the old validations could be replaced by implementing a schema for the XML. Schemas make it possible to specify that some elements must be defined in the XML or require that some properties or attributes must be set. You can even enforce minimum and maximum values for certain elements.

The following is a list of all the validations that were kept from the old SurveyApi and whether they can replace by an XML schema in the future.

many informal forms

Due to time constraints the XML schema hasn't been implemented at the time of writing this report.

Validation	Could be replaced by Schema?
No sections without survey items	Yes
The survey contains at least one section	Yes
Questions have a description	Yes
No survey items without questions	Yes
No double keys for survey items	No
Answer types do not contain errors such as minimum values being higher than maximum values or allowing a user to select more answers than there are in multiple choice questions.	Yes

TABLE 5 LIST OF VALIDATIONS THAT COULD BE REPLACED BY XML SCHEMA.

There are two new validation types that were added due to changes made to the code. These validations can not be made through a schema as they require other data to validate. The two new validations are specified in the list below.

- **Answer type validation**: The survey specification can be split up into two separate documents, one containing the survey and its questions and the other containing the answer types that can be used. When this is done validation is needed to ensure that an error is returned if a question does not have any answer type.
- **Visibility validation**: Each condition needs to be validated to ensure that it is possible for it to be passed. Each question that is referenced in a condition must exist and must have the value specified as an option in its answers. The answer type of those questions needs to be validated too.

conclusion is more a reflection,
unclear if all research qustions were answered

Evaluation

My graduation internship at Indicia was an informative experience. I really enjoyed working on the assignment, it was a subject I was interested in and I am glad I got the chance to work on it. During the time I worked on the assignment I really felt like I was able to apply the skills I learned in my years at Fontys.

At the start of this internship I felt slightly overwhelmed by the assignment and it wasn't exactly clear to me how I was supposed to complete it, but thanks to the research questions and the help and advice of my company tutor it became manageable.

Some issues were run into while working on this project. In hindsight. using the data contract serialiser without properly researching the other available serialiser too and their positives and drawbacks set back the implementation quite a bit.

One other unforeseen issue was the lockdown due to Covid-19. Working at home feels a lot different than working in the office, and while I enjoyed it for the first while I eventually ended up being less motivated to work. Luckily thanks to some advice I received from the others at Indicia I managed to bounce back from it.

Me being sick for 2 entire weeks also did not help much, it was difficult to get back into the groove after that as you lose some of the momentum you had before.

These issues together delayed the assignment quite a bit, I still have four weeks left of the internship as of the time of writing this report, and I fully intend to finish the assignment during those weeks.

I am glad I got to work on this project, and I am proud of the work I have done so far. The skills that I have gathered in the past few months will undoubtedly help me during my career in the future.