How to create PDF documents from XML templates

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Introduction

In addition to Fixed layout API, the Apitron PDF Kit for .NET component provides a Flow layout API which supports css-like styling, and is very similar to HTML in terms of elements structure. The difference between the two is described in the following blog post.

The Flow layout API also supports XML export and import, making it possible to create XML templates for documents or PDF forms and later use them as a base, adding the necessary data or filling the PDF fields for example.

In this article we'll show how to work with XML templates and produce PDF documents using Flow layout API.

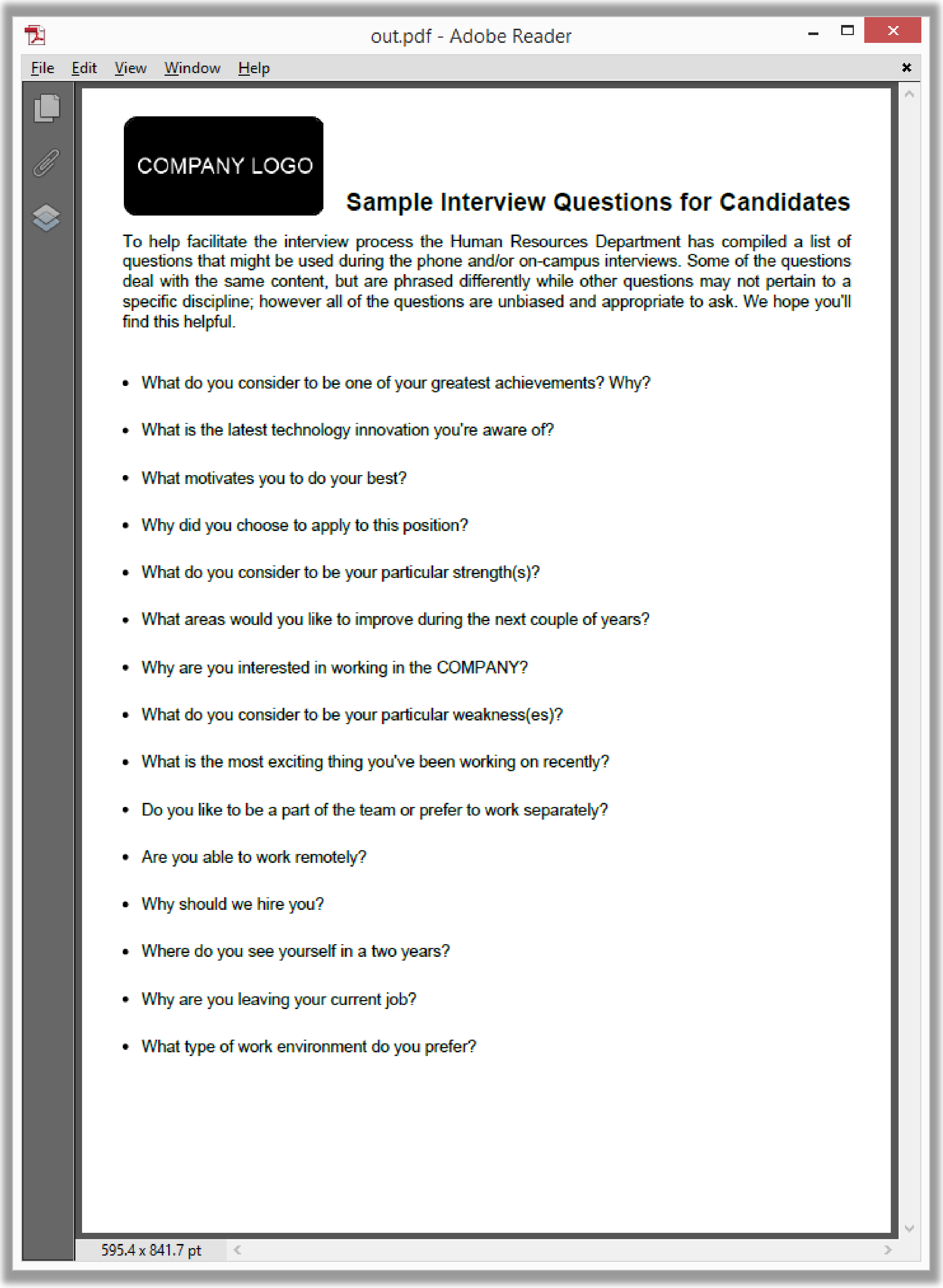
Creating the base template

Usually, we start with the template by creating it from code, so it’s the code first approach. Of course, it’s possible to create the XML template from scratch, but starting from code is a bit more convenient and speeds up the initial development.

```
private static void CreateTemplate()
{
    // create resource manager and register image resource
    ResourceManager resourceManager = new ResourceManager();
    resourceManager.RegisterResource(new Image("logo", "../../images/logo.png", true));

    // create document object and register styles
    FlowDocument doc = new FlowDocument(){Margin = new Thickness(30, 20, 30, 20) };
    // style for image logo
    doc.StyleManager.RegisterStyle(".logo", new Style() {Margin = new Thickness(0, 0, 10, 10)});
    // style for note below the header
    doc.StyleManager.RegisterStyle(".headerNote", new Style()
      {
          Display = Display.InlineBlock,
          Align = Align.Justify
      });
    // style for header
    doc.StyleManager.RegisterStyle(".header",
       new Style()
       {
           Font = new Font(StandardFonts.HelveticaBold, 18),
           Display = Display.InlineBlock,
           Align = Align.Right,
           VerticalAlign = VerticalAlign.Bottom,
           Margin = new Thickness(0, 0, 0, 10)
       });
    // style for unordered list
    doc.StyleManager.RegisterStyle(".ul", new Style()
        {
            ListStyle = ListStyle.Unordered,
            ListMarker = ListMarker.Circle,
            ListMarkerPadding = new Thickness(0, 0, 10, 0),
            Margin = new Thickness(0, 20, 0, 0)
        });
    //style for list items
    doc.StyleManager.RegisterStyle(".ul > *", new Style()
        {
            ListStyle = ListStyle.ListItem,
            Margin = new Thickness(0, 10, 0, 10)
        });

    doc.Add(new Image("logo") {Class = "logo"});

    doc.Add(new TextBlock("Sample Interview Questions for Candidates") {Class = "header"});
    doc.Add(new Br());

    // code continues on next page
   doc.Add(new TextBlock(
            "To help facilitate the interview process the Human Resources Department " +
            "has compiled a list of questions that might be used during the phone " +
            "and/or on-campus interviews. " +
            "Some of the questions deal with the same content, " +
            "but are phrased differently while other questions may not pertain " +
            "to a specific discipline; however all of the questions" +
            " are unbiased and appropriate to ask. We hope you'll find " +
            "this helpful.") {Class = "headerNote"});

    // add questions list
    Section list = new Section() {Class = "ul"};

    list.Add(new TextBlock("What do you consider to be one of your greatest achievements? Why?"));
    list.Add(new TextBlock("What is the latest technology innovation you're aware of?"));
    list.Add(new TextBlock("What motivates you to do your best?"));
    list.Add(new TextBlock("Why did you choose to apply to this position?"));
    list.Add(new TextBlock("What do you consider to be your particular strength(s)?"));
    list.Add(new TextBlock("What areas would you like to improve during the next two years?"));
    list.Add(new TextBlock("Why are you interested in working in the COMPANY?"));
    list.Add(new TextBlock("What do you consider to be your particular weakness(es)?"));
    list.Add(new TextBlock("What is the most exciting thing you've been working on recently?"));
    list.Add(new TextBlock("Do you like to be a part of the team or prefer to work separately?"));
    list.Add(new TextBlock("Are you able to work remotely?"));
    list.Add(new TextBlock("Why should we hire you?"));
    list.Add(new TextBlock("Where do you see yourself in a two years?"));
    list.Add(new TextBlock("Why are you leaving your current job?"));
    list.Add(new TextBlock("What type of work environment do you prefer?"));

    doc.Add(list);

    // export as PDF
    using (Stream stream = File.Create("out.pdf"))
    {
        doc.Write(stream, resourceManager);
    }

    // create XML template
    using (Stream stream = File.Create("template.xml"))
    {
        doc.SaveToXml(stream, resourceManager);
    }
}
```

As you can see from the code sample above, we create a very simple questionnaire for an imaginable HR department. First come the company logo and header, then additional note, and lastly a list of questions. When the document is filled up, we create a PDF for previewing and corresponding XML file for later use.

The generated document looks as follows:



Sample Interview Questions for Candidates

To help facilitate the interview process the Human Resources Department has compiled a list of questions that might be used during the phone and/or on-campus interviews. Some of the questions deal with the same content, but are phrased differently while other questions may not pertain to a specific discipline; however all of the questions are unbiased and appropriate to ask. We hope you'll find this helpful.

- What do you consider to be one of your greatest achievements? Why?
- What is the latest technology innovation you're aware of?
- What motivates you to do your best?
- Why did you choose to apply to this position?
- What do you consider to be your particular strength(s)?
- What areas would you like to improve during the next couple of years?
- Why are you interested in working in the COMPANY?
- What do you consider to be your particular weakness(es)?
- What is the most exciting thing you've been working on recently?
- Do you like to be a part of the team or prefer to work separately?
- Are you able to work remotely?
- Why should we hire you?
- Where do you see yourself in a two years?
- Why are you leaving your current job?
- What type of work environment do you prefer?

Pic. 1 Created PDF document

The resulting XML template

```xml
<?xml version="1.0" encoding="utf-8"?>
<FlowDocument xmlns="Apitron.PDF.Kit.FlowLayout.v1">
  <Resources>
    <Image resourceId="logo" fileName="../../images/logo.png" />
  </Resources>
  <Styles>
    <Style selector="flowdocument">
      <Color value="Black" />
    </Style>
    <Style selector="grid">
      <InnerBorder thickness="1" />
      <InnerBorderColor value="Black" />
    </Style>
    <Style selector=".logo">
      <Margin value="0,0,10,10" />
    </Style>
    <Style selector=".headerNote">
      <Align value="Justify" />
      <Display value="InlineBlock" />
    </Style>
    <Style selector=".header">
      <Align value="Right" />
      <Display value="InlineBlock" />
      <Font resourceId="Helvetica-Bold" size="18" />
      <Margin value="0,0,0,10" />
      <VerticalAlign value="Bottom" />
    </Style>
    <Style selector=".ul">
      <ListMarker value="Circle" />
      <ListMarkerPadding value="0,0,10,0" />
      <ListStyle value="Unordered" />
      <Margin value="0,20,0,0" />
    </Style>
    <Style selector=".ul > *">
      <ListStyle value="ListItem" />
      <Margin value="0,10,0,10" />
    </Style>
  </Styles>
  <Elements>
    <Image>
      <Properties>
        <Class value="logo" />
        <ResourceId value="logo" />
      </Properties>
    </Image>
    <TextBlock>
      <Properties>
        <Class value="header" />
        <Text value="Sample Interview Questions for Candidates" />
      </Properties>
    </TextBlock>
    <Br />
   // code continues on next page
```

```
    <TextBlock>
      <Properties>
        <Class value="headerNote" />
        <Text value="To help facilitate the interview process the Human Resources Department has
compiled a list of questions that might be used during the phone and/or on-campus interviews. Some
of the questions deal with the same content, but are phrased differently while other questions may
not pertain to a specific discipline; however all of the questions are unbiased and appropriate to
ask. We hope you'll find this helpful." />
      </Properties>
    </TextBlock>
    <Section>
      <Elements>
        <TextBlock>
          <Properties>
            <Text value="What do you consider to be one of your greatest achievements? Why?" />
          </Properties>
        </TextBlock>

        ...questions

        <TextBlock>
          <Properties>
            <Text value="What type of work environment do you prefer?" />
          </Properties>
        </TextBlock>
      </Elements>
      <Properties>
        <Class value="ul" />
      </Properties>
    </Section>
  </Elements>
  <Properties>
    <Margin value="30,20,30,20" />
  </Properties>
</FlowDocument>
```

You see that the resulting XML contains styles and values for elements' properties as well as the path to the image resource registered in document's resource manager. One of the benefits of having the XML template is the ability to alter documents without recompiling the app. See the next section to learn how to do it.

Changing template

Let’s design our app to accept XML templates as command line argument; in order to do it we’ll implement the entry point of the program as follows:

```
static void Main(string[] args)
{
    if (args == null || args.Length==0)
    {
        CreateTemplate();
    }
    else
    {
        LoadTemplate(args[0]);
    }
}
```

and add the template loading part:

```
private static void LoadTemplate(string templatePath)
{
    using (Stream stream = File.OpenRead(templatePath),
        outputStream = File.Create("fromTemplate.pdf"))
    {
        ResourceManager resourceManager = new ResourceManager();

        FlowDocument doc = FlowDocument.LoadFromXml(stream, resourceManager );

        doc.Write(outputStream, resourceManager);
    }
}
```

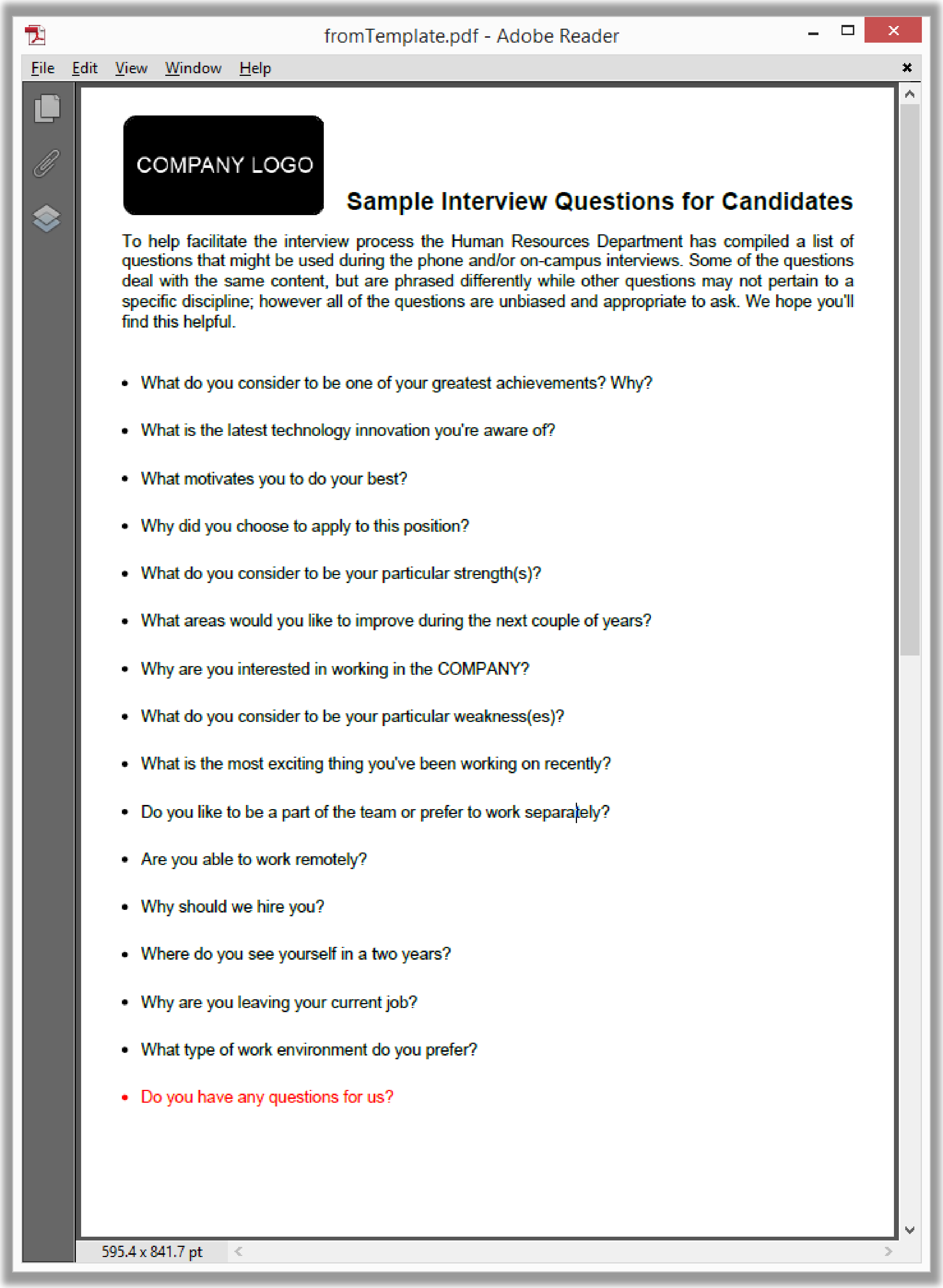
After that, let’s add new content to the xml template we have. Insert the following piece of XML that creates new textblock in the *Elements* collection of the *Section* element:

```
<TextBlock>
    <Properties>
        <Color value="Red" />
        <Text value="Do you have any questions for us?" />
    </Properties>
</TextBlock>
```

It adds new question and makes it drawn in red color. Execute the program with command line parameter “template.xml” and new PDF file will be created for you.

The complete example can be found in our GitHub repository (link).

Resulting PDF document generated from xml template looks as follows:



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- What is the latest technology innovation you're aware of?
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- What do you consider to be your particular strength(s)?
- What areas would you like to improve during the next couple of years?
- Why are you interested in working in the COMPANY?
- What do you consider to be your particular weakness(es)?
- What is the most exciting thing you've been working on recently?
- Do you like to be a part of the team or prefer to work separately?
- Are you able to work remotely?
- Why should we hire you?
- Where do you see yourself in a two years?
- Why are you leaving your current job?
- What type of work environment do you prefer?
- Do you have any questions for us?

Pic. 2 Modified PDF file created from XML template

Conclusion

Apitron PDF Kit for .NET component is a reliable PDF library that can be used to process PDF documents of any origin and manipulate their content in any desired way. Its easy to learn and well-structured API speeds up the development process and helps to achieve the desired results saving development time for other tasks.