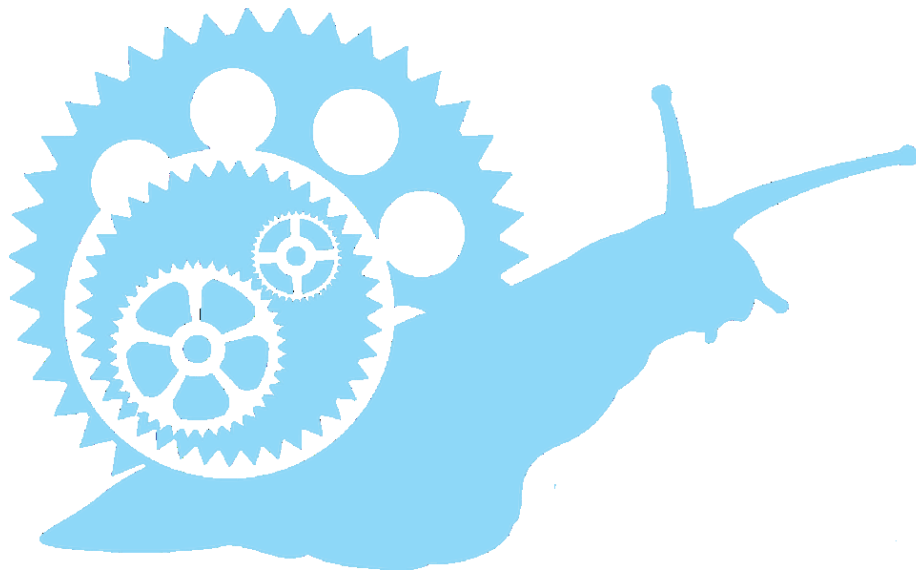


# HYPOTHESIS

## Basics of code editing



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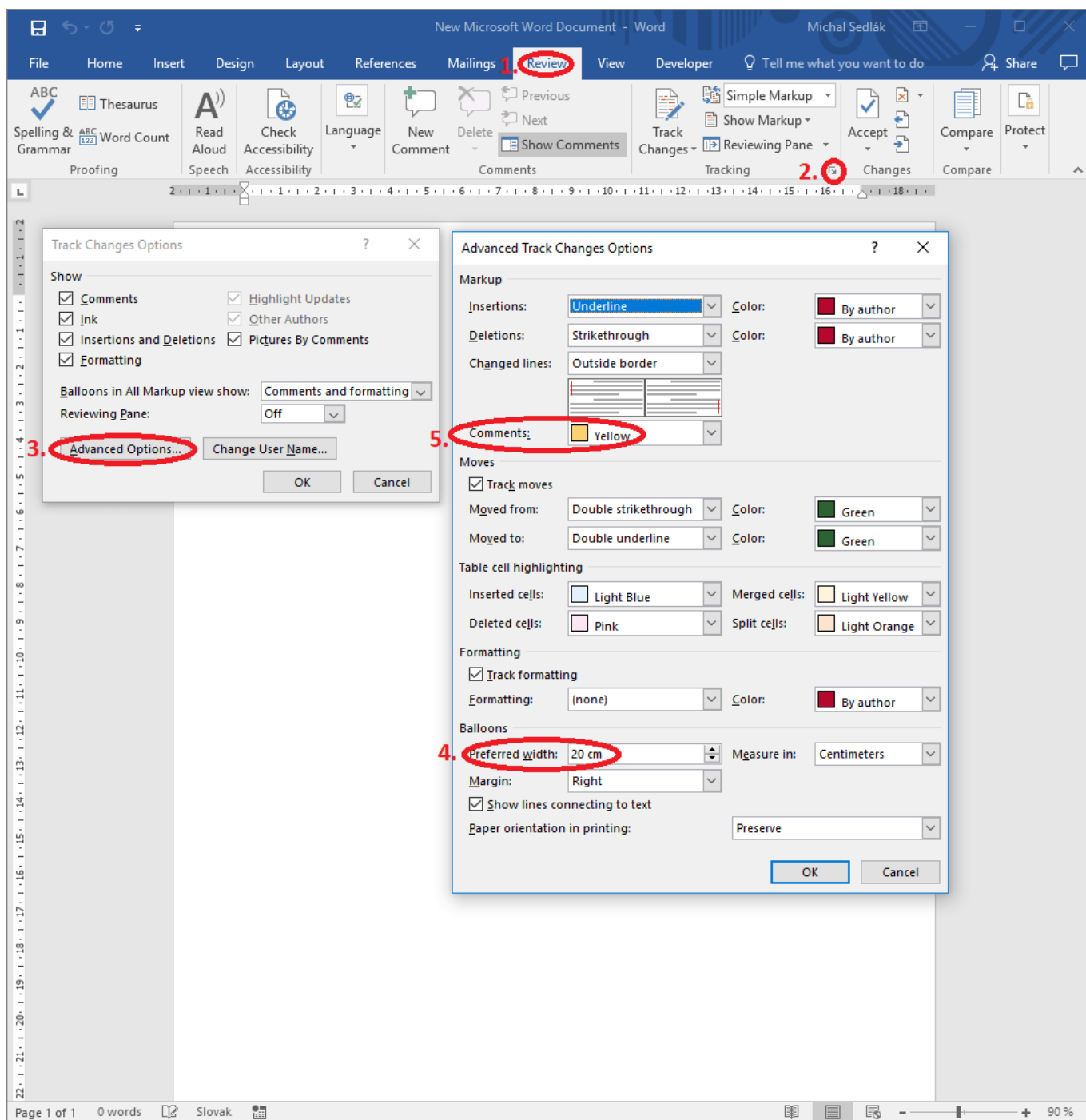
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# Setting of MS Word

Before you start using this manual, you need to change the setting of MS Word. In MS Word 2016 you should do the following:

1. In the “Ribbon” click on the tab “Review”.
2. Click on the button “Change Tracking Options”.
3. Click on the button “Advanced Options...”
4. Change “Preferred width” to “20 cm”.
5. OPTIONAL: Change “Comments” to “Yellow”. (it is good for reading)



# Lecture 1 - code structure

Each slide consists of 2 parts of code ("SlideTemplate" and "SlideContent") which are located in different tables in the database. "SlideTemplate" is the main code and if it is complete, it doesn't need "SlideContent". However, "SlideContent" can be used to create additional slides without always copying the whole "SlideTemplate" code. In "SlideContent" you write only the additional code which complements the "SlideTemplate" code for creation of a new slide.

In this example, all the code is in "SlideTemplate". An empty "SlideContent" is included. If you go to the hypothesis web application (<http://demo-hypothesis.phil.muni.cz>) to the "Slide management" tab and copy-paste the code there, it will show the whole slide. "SlideTemplate" should be in the upper box and "SlideContent" in the lower box.

Your first task is to go through this code and examine its structure. This is a simple code for a questionnaire slide. It consists only from 2 main blocks:

- **VIEWPORT** = contains code for what is shown on the slide screen
- **ACTIONS** = contain code for processes and commands, which are activated from other part of the code

Also, pay attention to coding conventions used in the source code, such as the use of indentation and white spaces. Although it has no effect on the functionality of the source code, using these conventions helps to make the code more readable and understandable. It makes it easier to identify blocks of code and their hierarchy.

## SlideTemplate 1

```
<?xml version="1.0" encoding="UTF-8"?>
<SlideTemplate UID="AA000021-GA47-GA47-GA47-MICHALSEDLAK">
  <Viewport>

    <VerticalLayout Id="ct001">
      <Properties>
        <Width Value="100%" />
        <Height Value="100%" />
      </Properties>
      <Components>

        <!--nadpis-->
        <HorizontalLayout Id="ct001_ct001">
          <Properties>
            <Width Value="100%" />
            <Height Value="15%" />
            <Alignment Value="mc" />
          </Properties>
          <Components>
            <Label Id="title">
              <Properties>
                <Caption Value="&lt;h2&gt;This is a questionnaire with use of different types of fields
for different types of questions. &lt;/h2&gt;
                " />
              </Properties>
            </Label>
          </Components>
        </HorizontalLayout>
      </Components>
    </VerticalLayout>
  </Viewport>
</SlideTemplate>
```

```

        </Properties>
    </Label>
</Components>
</HorizontalLayout>

<!--oblast formulára-->
<HorizontalLayout Id="ct001_ct002">
    <Properties>
        <Width Value="70%" />
        <Height Value="70%" />
    </Properties>
    <Components>
        <FormLayout Id="ct001_ct002_ct001"> <!--FORM LAYOUT-->
            <Properties>
                <Border Value="True" />
                <Width Value="80%" />
                <Height Value="100%" />
            </Properties>
            <Components>

                <ComboBox Id="field_1">
                    <Properties>
                        <Width Value="150px" />
                        <Caption Value="Your gender:" />
                    </Properties>
                    <Items>
                        <Item Value="1" Caption="Male" />
                        <Item Value="2" Caption="Female" />
                    </Items>
                </ComboBox>

                <ComboBox Id="field_2">
                    <Properties>
                        <Width Value="150px" />
                        <Caption Value="Are you wearing glasses?" />
                    </Properties>
                    <Items>
                        <Item Value="1" Caption="Yes" />
                        <Item Value="2" Caption="No" />
                    </Items>
                </ComboBox>

                <TextField Id="field_3">
                    <Properties>
                        <Width Value="150px" />
                        <Caption Value="Your nationality:" />
                    </Properties>
                </TextField>

                <DateField Id="field_4">
                    <Properties>
                        <Width Value="150px" />
                        <Caption Value="What date do you like?" />
                    </Properties>
                </DateField>

                <TextField Id="field_5">
                    <Properties>
                        <Width Value="50px" />
                        <Caption Value="How do you like this questionnaire? (must be ranked from 1 to 4)" />
                    </Properties>
                    <Validators>
                        <Empty>
                            <Message>Must be filled.</Message>
                        </Empty>
                        <Integer>
                            <Message>Must be integer.</Message>
                        </Integer>
                        <Range>
                            <Message>Must be between 1 and 4.</Message>
                            <Min Value="1" />
                            <Max Value="4" />
                        </Range>
                    </Validators>
                </TextField>

                <TextField Id="field_6">

```

```

<Properties>
  <Width Value="50px" />
  <Caption Value="How did you like the previous question? (must be ranked from 1 to 4)" />
</Properties>
<Validators>
  <Empty>
    <Message>Must be filled.</Message>
  </Empty>
  <Integer>
    <Message>Must be integer.</Message>
  </Integer>
  <Range>
    <Message>Must be between 1 and 4.</Message>
    <Min Value="1" />
    <Max Value="4" />
  </Range>
</Validators>
</TextField>

<TextArea Id="field_7">
  <Properties>
    <Width Value="500px" />
    <Height Value="150px" />
    <Caption Value="In general, what do you think about world?" />
  </Properties>
</TextArea>

<HorizontalLayout Id="field_8">
  <Properties>
    <Width Value="500px" />
    <Height Value="10%" />
    <Caption Value="How many legs do you have?" />
  </Properties>
  <Components>
    <SelectPanel Id="select08">
      <Properties>
        <Width Value="100%" />
        <Height Value="50px" />
        <LabelPosition Value="top" />
        <Captions Value="'0 legs', '1 leg', '2 legs'" />
      </Properties>
    </SelectPanel>
  </Components>
</HorizontalLayout>

<HorizontalLayout Id="field_9">
  <Properties>
    <Width Value="500px" />
    <Height Value="10%" />
    <Caption Value="Which numbers do you like? (you can choose multiple answers) " />
  </Properties>
  <Components>
    <SelectPanel Id="select09">
      <Properties>
        <Width Value="100%" />
        <Height Value="50px" />
        <LabelPosition Value="top" />
        <Captions Value="'1', '2', '3', '4', '5', '6', '7'" />
        <MultiSelect Value="True" />
      </Properties>
    </SelectPanel>
  </Components>
</HorizontalLayout>

<HorizontalLayout Id="field_10">
  <Properties>
    <Width Value="500px" />
    <Height Value="10%" />
    <Caption Value="How do you feel?" />
  </Properties>
  <Components>

    <Panel Id="left10">
      <Properties>
        <Width Value="25%" />
        <Height Value="50px" />
      </Properties>
    </Components>

```

```

        <Label Id="left10_label">
            <Properties>
                <Caption Value="Very well" />
            </Properties>
        </Label>
    </Components>
</Panel>

<VerticalLayout Id="medium10">
    <Properties>
        <Width Value="50%" />
        <Height Value="50px" />
    </Properties>
    <Components>
        <SelectPanel Id="select10">
            <Properties>
                <Width Value="100%" />
                <Height Value="100%" />
                <LabelPosition Value="top" />
                <Captions Value="'1','2','3','4','5'" />
            </Properties>
        </SelectPanel>
    </Components>
</VerticalLayout>

<Panel Id="right10">
    <Properties>
        <Width Value="25%" />
        <Height Value="50px" />
    </Properties>
    <Components>
        <Label Id="right10_label">
            <Properties>
                <Caption Value="Very bad" />
            </Properties>
        </Label>
    </Components>
</Panel>

    </Components>
</HorizontalLayout>

</Components>
</FormLayout>
</Components>
</HorizontalLayout>

<!-- spodná Lišta-->
<HorizontalLayout Id="ct001_ct003">
    <Properties>
        <Width Value="100%" />
        <Height Value="10%" />
        <Alignment Value="mc" />
    </Properties>
    <Components>

        <Panel Id="ct001_ct003_ct001"> <!--miesto naľavo od tlačítka-->
            <Properties>
                <Border Value="False" />
                <Width Value="80%" />
                <Height Value="100%" />
            </Properties>
        </Panel>

        <Button Id="button"> <!--tlačítko - pokračovanie ďalej-->
            <Properties>
                <Width Value="10%" />
                <Height Value="80%" />
                <Caption Value="Next →" />
            </Properties>
            <Handlers>
                <Click>
                    
                </Click>
            </Handlers>
        </Button>
    </Components>

```

```

        <Panel Id="ct001_ct003_ct003"> <!--miesto napravo od tlačítka-->
            <Properties>
                <Border Value="False" />
                <Width Value="10%" />
                <Height Value="100%" />
            </Properties>
        </Panel>

    </Components>
</HorizontalLayout>

<!--zápätie (voľný priestor na spodku)-->
<HorizontalLayout Id="ct001_ct004">
    <Properties>
        <Width Value="100%" />
        <Height Value="5%" />
        <Alignment Value="mc" />
    </Properties>
</HorizontalLayout>

</Components>
</VerticalLayout>
</Viewport>

<Actions>

</Actions>

</SlideTemplate>

```

## SlideContent 1

```

<?xml version="1.0" encoding="UTF-8"?>
<SlideContent TemplateUID="AA000021-GA47-GA47-GA47-MICHALSEDLAK">
    <Bindings>
        <Bind>
        </Bind>
    </Bindings>
</SlideContent>

```

## Homework 1

For work with the source code, it is recommended to use some text editor for programmers, for example "PSPad" (available at [www.pspad.com](http://www.pspad.com)). Create a new XML file there and copy the code from this word document. Modify the code there and then copy it to the "Slide management" tab to see the result.

1) Try to change the text in title.



- 2) Try to change the text in one of the questions.
- 3) Try to change the text in the "Next →" button.
- 4) Try to change the order of the components.
- 5) Try to create additional components (questions) in the questionnaire.

# Lecture 2 - slide layout

Your task in this example is to go through this code and examine the use of “VerticalLayout” and “HorizontalLayout”.

## SlideTemplate 2

```
<?xml version="1.0" encoding="UTF-8"?>
<SlideTemplate
  UID="AA00019-GA47-GA47-GA47-MICHALSEDLAK">

  <Viewport>
    <VerticalLayout Id="ct001">
      <Properties>
        <Width Value="100%" />
        <Height Value="100%" />
      </Properties>
      <Components>

        <!--vrch - nadpis-->
        <HorizontalLayout Id="ct001_ct001">
          <Properties>
            <Width Value="80%" />
            <Height Value="15%" />
            <Alignment Value="mc" />
          </Properties>
          <Components>
            <Label Id="title">
              <Properties>
                <Caption Value="&lt;h2&gt;The video can be paused and played by the buttons to the right.
&lt;/h2&gt;";
                " />
              </Properties>
            </Label>
          </Components>
        </HorizontalLayout>

        <!--stred - video, tlačítka (zľava doprava) -->
        <HorizontalLayout Id="ct001_ct002">
          <Properties>
            <Width Value="100%" />
            <Height Value="75%" />
            <Alignment Value="mc" />
          </Properties>
          <Components>

            <HorizontalLayout Id="ct001_ct002_ct001"> <!--miesto naľavo od videa-->
              <Properties>
                <Width Value="5%" />
                <Height Value="100%" />
              </Properties>
            </HorizontalLayout>

            <Panel Id="ct001_ct002_ct002"> <!--video-->
              <Properties>
                <Border Value="True" />
                <Width Value="70%" />
                <Height Value="100%" />
              </Properties>
            </Panel>
          </Components>
        </HorizontalLayout>
      </Components>
    </VerticalLayout>
  </Viewport>
</SlideTemplate>
```

```

    <Components>
      <Video Id="video">
        <Properties>
          <Width Value="720px" />
          <Height Value="480px" />
        </Properties>
        <Sources>
          <Source Url="https://is.muni.cz/www/400072/71117165/71117166/prelet_h264_.mp4" /> <!--mp4
musí být s video kodekom H264-->
        </Sources>
        <Handlers>
          <Load>
            <Expression>video->play()</Expression>
          </Load>
        </Handlers>
      </Video>
    </Components>
  </Panel>

  <HorizontalLayout Id="ct001_ct002_ct003"> <!--miesto medzi videom a tlačítkami-->
    <Properties>
      <Width Value="5%" />
      <Height Value="100%" />
    </Properties>
  </HorizontalLayout>

  <Button Id="button_pause"> <!--tlačítka-->
    <Properties>
      <Width Value="5%" />
      <Height Value="10%" />
      <Caption Value="Pause" />
    </Properties>
    <Handlers>
      <Click>
        <Expression>video->pause()</Expression>
      </Click>
    </Handlers>
  </Button>

  <HorizontalLayout Id="ct001_ct002_ct005"> <!--miesto medzi tlačítkami-->
    <Properties>
      <Width Value="5%" />
      <Height Value="100%" />
    </Properties>
  </HorizontalLayout>

  <Button Id="button_play"> <!--tlačítka-->
    <Properties>
      <Width Value="5%" />
      <Height Value="10%" />
      <Caption Value="Play" />
    </Properties>
    <Handlers>
      <Click>
        <Expression>video->play()</Expression>
      </Click>
    </Handlers>
  </Button>

  <HorizontalLayout Id="ct001_ct002_ct007"> <!--miesto napravo od tlačítka-->
    <Properties>
      <Width Value="5%" />
      <Height Value="100%" />
    </Properties>
  </HorizontalLayout>

  </Components>
</HorizontalLayout>

<!--spodná lišta-->
<HorizontalLayout Id="ct001_ct003">
  <Properties>
    <Width Value="100%" />
    <Height Value="10%" />
    <Alignment Value="mc" />
  </Properties>
  <Components>

```

```

    <Panel Id="ct001_ct003_ct001"> <!--miesto naľavo od tlačítka-->
      <Properties>
        <Border Value="False" />
        <Width Value="80%" />
        <Height Value="100%" />
      </Properties>
    </Panel>

    <Button Id="button"> <!--tlačítko - pokračovanie ďalej-->
      <Properties>
        <Width Value="10%" />
        <Height Value="80%" />
        <Caption Value="Next →" />
      </Properties>
      <Handlers>
        <Click>
          <Call Action="nextSlide" />
        </Click>
      </Handlers>
    </Button>

    <Panel Id="ct001_ct003_ct003"> <!--miesto napravo od tlačítka-->
      <Properties>
        <Border Value="False" />
        <Width Value="10%" />
        <Height Value="100%" />
      </Properties>
    </Panel>

  </Components>
</HorizontalLayout>

<!--zápätie (voľný priestor na spodku)-->
<HorizontalLayout Id="ct001_ct004">
  <Properties>
    <Width Value="100%" />
    <Height Value="5%" />
    <Alignment Value="mc" />
  </Properties>
</HorizontalLayout>

</Components>
</VerticalLayout>
</Viewport>

<Variables>
  <Variable Id="video" Type="Object">
    <Reference>
      <Component Id="video" />
    </Reference>
  </Variable>
</Variables>

<Actions>
  <Action Id="nextSlide">
    <Expression>Navigator->next()</Expression>
  </Action>
</Actions>

</SlideTemplate>

```

# SlideContent 2

```
<?xml version="1.0" encoding="UTF-8"?>  
<SlideContent TemplateUID="AA000019-GA47-GA47-GA47-MICHALSEDLAK">  
  <Bindings>  
    <Bind>  
    </Bind>  
  </Bindings>  
</SlideContent>
```

# Lecture 3 - code flow

In this lecture, we are going to work with complex code, which does not only contain **VIEWPORT** and **ACTIONS** blocks, but also blocks:

- **HANDLERS** = define, that anytime some condition is met, some specified effect follows
- **TIMERS** = are activated from other part of code, and it counts down, some specified effect follows
- **VARIABLES** = a place where you define all variables, which are used in other parts of code
- **OUTPUTVALUE** = defines which variable is sent to the next slide when this slide finishes

These blocks of code are connected and the code flow jumps between them. You can imagine it as one bubble of code calling another bubble of code, which then calls another bubble of code and so on. To help you understand, you can look at the “Code flow” chart at the end of this lecture. Your task is to go through this code and try to understand the code flow.

This slide can be shown in the “Slide management” tab, however it will not work correctly there (at this moment the keyboard input doesn’t work there). To see this slide correctly, open the “Public” tab and start the test with name “sample: slideshow (keyboard, feedback)”.

## SlideTemplate 3

```
<?xml version="1.0" encoding="UTF-8"?>
<SlideTemplate
  xmlns:maps="http://hypothesis.cz/xml/maps"
  UID="AA000017-GA47-GA47-GA47-MICHALEDLAK">

  <Viewport>
    <VerticalLayout Id="ct001">
      <Properties>
        <Width Value="100%" />
        <Height Value="100%" />
      </Properties>
      <Components>

        <!--vrch - nadpis-->
        <HorizontalLayout Id="ct001_ct001">
          <Properties>
            <Width Value="80%" />
            <Height Value="15%" />
            <Alignment Value="mc" />
          </Properties>
          <Components>
            <Label Id="title">
              <Properties>
                <Caption Value="&lt;h2&gt;React to the position of the word by pressing the corresponding
key on the keyboard. &lt;/h2&gt;" />
              </Properties>
            </Label>
          </Components>
        </HorizontalLayout>

        <!--stred-->
        <HorizontalLayout Id="ct001_ct002">
          <Properties>
```

```

    <Width Value="100%" />
    <Height Value="70%" />
    <Alignment Value="mc" />
  </Properties>
  <Components>
    <maps:Map Id="map">
      <Properties>
        <Width Value="677px" />
        <Height Value="677px" />
      </Properties>
      <Layers>
        <ImageSequenceLayer Id="sequence_layer">
          <Images>
            <!-- tile number 0 -->
            <Image Url="http://hypothesis.phil.muni.cz:88/gallery/albums/userpics/10005/bez_popisu.png" />

            <!-- tile number 1, 2, 3, 4, 5 -->
            <Image Url="http://hypothesis.phil.muni.cz:88/gallery/albums/userpics/10005/stroop_H5_en.png" />
            <Image Url="http://hypothesis.phil.muni.cz:88/gallery/albums/userpics/10005/stroop_L4_en.png" />
            <Image Url="http://hypothesis.phil.muni.cz:88/gallery/albums/userpics/10005/stroop_D3_en.png" />
            <Image Url="http://hypothesis.phil.muni.cz:88/gallery/albums/userpics/10005/stroop_P2_en.png" />
            <Image Url="http://hypothesis.phil.muni.cz:88/gallery/albums/userpics/10005/stroop_P4_en.png" />
          </Images>
          <Handlers>
            <Load>
              <Expression>map->unmask()</Expression>
            </Load>
            <Change>
              <Call Action="tile_change" />
            </Change>
          </Handlers>
        </ImageSequenceLayer>
        <FeatureLayer Id="feature_layer">
          <Features>
            <Feature Id="ok_sign">
              <Geometry Value="LINESTRING (100 100,125 125,150 75)" />
              <Properties>
                <Hidden Value="true" />
                <Style Value="ok_style" />
              </Properties>
            </Feature>
            <Feature Id="fail_sign">
              <Geometry Value="MULTILINESTRING ((100 100,150 150),(100 150,150 100))" />
              <Properties>
                <Hidden Value="true" />
                <Style Value="fail_style" />
              </Properties>
            </Feature>
          </Features>
        </FeatureLayer>
      </Layers>
      <Styles>
        <Style Id="ok_style">
          <StrokeColor Value="#00ff00" />
          <StrokeWidth Value="5" />
          <FillOpacity Value="0" />
        </Style>
        <Style Id="fail_style">
          <StrokeColor Value="red" />
          <StrokeWidth Value="5" />
          <FillOpacity Value="0" />
        </Style>
      </Styles>
    </maps:Map>
  </Components>
</HorizontalLayout>

<!-- spodná lišta -->
<HorizontalLayout Id="ct001_ct003">
  <Properties>
    <Width Value="100%" />
    <Height Value="10%" />
    <Alignment Value="mc" />
  </Properties>
  <Components>

    <Panel Id="ct001_ct003_ct001"> <!--miesto naľavo od tlačítka-->

```

```

        <Properties>
            <Border Value="False" />
            <Width Value="80%" />
            <Height Value="100%" />
        </Properties>
    </Panel>

    <Button Id="button"> <!-- tlačítko - pokračovanie ďalej-->
        <Properties>
            <Width Value="10%" />
            <Height Value="80%" />
            <Caption Value="Next →" />
        </Properties>
        <Handlers>
            <Click>
                <Call Action="nextSlide" />
            </Click>
        </Handlers>
    </Button>

    <Panel Id="ct001_ct003_ct003"> <!-- miesto napravo od tlačítka-->
        <Properties>
            <Border Value="False" />
            <Width Value="10%" />
            <Height Value="100%" />
        </Properties>
    </Panel>

</Components>
</HorizontalLayout>

<!-- zápätie (voľný priestor na spodku)-->
<HorizontalLayout Id="ct001_ct004">
    <Properties>
        <Width Value="100%" />
        <Height Value="5%" />
        <Alignment Value="mc" />
    </Properties>
</HorizontalLayout>

</Components>
</VerticalLayout>
</Viewport>

<Handlers>
    <Init>
        <Expression>map->mask()</Expression>
        <Expression>index=firstIndex</Expression>
        <Expression>tilesCount=seqLayer->getTilesCount()</Expression> <!-- find out the number
of all tiles in ImageSequenceLayer -->
        <If>
            <Expression>tilesCount<=firstIndex</Expression>
            <True>
                <Call Action="nextSlide" />
            </True>
        </If>
    </Init>
    <Shortcut Key="Left">
        <Expression>key=1</Expression>
        <Call Action="key_press" />
    </Shortcut>
    <Shortcut Key="Right">
        <Expression>key=2</Expression>
        <Call Action="key_press" />
    </Shortcut>
    <Shortcut Key="Up">
        <Expression>key=3</Expression>
        <Call Action="key_press" />
    </Shortcut>
    <Shortcut Key="Down">
        <Expression>key=4</Expression>
        <Call Action="key_press" />
    </Shortcut>
</Handlers>

```



```

<Timers>
  <Timer Id="break_timer">
    <Properties>
      <Time Value="500" />
    </Properties>
    <Handlers>
      <Stop>
        <Expression>seqLayer->setTileIndex(index)</Expression>
with index "index" (next tile) -->
      </Stop>
    </Handlers>
  </Timer>
  <Timer Id="marker_timer">
after correct answer -->
    <Properties>
      <Time Value="700" />
    </Properties>
    <Handlers>
      <Stop>
        <Call Action="break_tile" />
      </Stop>
    </Handlers>
  </Timer>
</Timers>

```

*<!-- change tile to tile*

*<!-- timer is activated*

<Variables>

```

<Variable Id="result" Type="Float" Value="0" />
<Variable Id="rightCount" Type="Float" Value="0" />
<Variable Id="failCount" Type="Float" Value="0" />
<Variable Id="tilesCount" Type="Integer" Value="0" />
<Variable Id="subCount" Type="Float" Value="0" />
<Variable Id="index" Type="Integer" Value="0" />
<Variable Id="temporal_Index" Type="Integer" Value="0" />
<Variable Id="keyIndex" Type="Integer" Value="0" />
<Variable Id="firstIndex" Type="Integer" Value="1" />
<Variable Id="clearIndex" Type="Integer" Value="0" />
<Variable Id="key" Type="Integer" Value="0" />
<Variable Id="answerKey" Type="Integer" Value="0" />
<Variable Id="answerKeys" Type="IntegerArray" Values="1,4,2,3,4" />

```

```

<Variable Id="keysDisabled" Type="Boolean" Value="true" />

```

```

<Variable Id="map" Type="Object">

```

```

  <Reference>
    <Component Id="map" />
  </Reference>
</Variable>

```

```

<Variable Id="seqLayer" Type="Object">

```

```

  <Reference>
    <Component Id="sequence_layer" />
  </Reference>
</Variable>

```

```

<Variable Id="failMarker" Type="Object">

```

```

  <Reference>
    <Component Id="fail_sign" />
  </Reference>
</Variable>

```

```

<Variable Id="okMarker" Type="Object">

```

```

  <Reference>
    <Component Id="ok_sign" />
  </Reference>
</Variable>

```

```

<Variable Id="break_timer" Type="Object">

```

```

  <Reference>
    <Timer Id="break_timer" />
  </Reference>
</Variable>

```

```

<Variable Id="marker_timer" Type="Object">

```

```

  <Reference>
    <Timer Id="marker_timer" />
  </Reference>

```

```

</Variable>
</Variables>

<Actions>
  <Action Id="key_press">
    <If>
      <Expression>!keysDisabled</Expression>
      <True>
        <Expression>keysDisabled=true</Expression> <!-- disable keys -->
        <If>
          <Expression>answerKey==key</Expression>
          <True>
            <Expression>rightCount=rightCount+1</Expression>
            <Call Action="hide_fail_marker" />
            <Call Action="show_ok_marker" />
          </True>
          <False>
            <Expression>failCount=failCount+1</Expression>
            <Call Action="show_fail_marker" />
          </False>
        </If>
      </True>
    </If>
  </Action>

  <Action Id="show_fail_marker">
    <Expression>failMarker->setHidden(false)</Expression>
    <Expression>keysDisabled=false</Expression> <!-- enable keys -->
  </Action>

  <Action Id="show_ok_marker">
    <Expression>okMarker->setHidden(false)</Expression>
    <Expression>marker_timer->start()</Expression> <!-- start timer
"marker_timer" -->
  </Action>

  <Action Id="hide_fail_marker">
    <Expression>failMarker->setHidden(true)</Expression>
  </Action>

  <Action Id="hide_ok_marker">
    <Expression>okMarker->setHidden(true)</Expression>
  </Action>

  <Action Id="tile_change">
    <Expression>temporal_Index=seqLayer->getTileIndex()</Expression>
    <If>
      <Expression>temporal_Index>=firstIndex</Expression> <!-- if: temporal_Index
>= firstIndex -->
      <True>
        <!-- Load the code of the key for the correct answer -->
        <Expression>keyIndex=temporal_Index-firstIndex</Expression>
        <Expression>answerKey=answerKeys->get(keyIndex)</Expression>
        <Expression>keysDisabled=false</Expression> <!-- enable keys -->
        </True>
        <False>
          <Expression>break_timer->start()</Expression> <!-- start timer
"break_timer", which when stops sets the next tile -->
        </False>
      </If>
    </Action>

    <Action Id="break_tile">
      <Call Action="hide_ok_marker" />
      <If>
        <Expression>index<tilesCount-1</Expression> <!-- if: current index <
index of last tile -->
        <True>
          <Expression>index=index+1</Expression>
          <Expression>seqLayer->setTileIndex(clearIndex)</Expression> <!-- change tile to tile
with index "clearIndex" (clearIndex = 0) -->
        </True>
        <False>
          <Call Action="calc_result" />
          <Call Action="nextSlide" />
        </False>
      </If>
    </Action>

```

```
<Action Id="calc_result">
  <Expression>subCount=tilesCount-firstIndex</Expression>
  <Expression>result=failCount/subCount</Expression>
</Action>

<Action Id="nextSlide">
  <Expression>Navigator->next()</Expression>
</Action>

</Actions>

<OutputValue1>
  <Expression>result</Expression>
</OutputValue1>

</SlideTemplate>
```

## SlideContent 3

```
<?xml version="1.0" encoding="UTF-8"?>
<SlideContent TemplateUID="AA000017-GA47-GA47-GA47-MICHALSEDLAK">
  <Bindings>
    <Bind>
    </Bind>
  </Bindings>
</SlideContent>
```

# Code flow 3

(parts of the code are left out to simplify recognition of the code flow)

```
<Handlers>
  <Init>
    <Expression>map->mask()</Expression>
  </Init>
</Handlers>
```



```
<ImageSequenceLayer Id="sequence_layer">
  <Handlers>
    <Load>
      <!-- images Loaded -->
      <Expression>map->unmask()</Expression>
    </Load>
  </Handlers>
</ImageSequenceLayer>
```

```
<Handlers>
  <Shortcut Key="Left">
    <Expression>key=1</Expression>
    <Call Action="key_press" />
  </Shortcut>
  <Shortcut Key="Right">
    <Expression>key=2</Expression>
    <Call Action="key_press" />
  </Shortcut>
  <Shortcut Key="Up">
    <Expression>key=3</Expression>
    <Call Action="key_press" />
  </Shortcut>
  <Shortcut Key="Down">
    <Expression>key=4</Expression>
    <Call Action="key_press" />
  </Shortcut>
</Handlers>
```



```
<Action Id="key_press">
  <!-- if: answerKey == key -->
  <True>
    <Call Action="show_ok_marker" />
  </True>
  <False>
    <Call Action="show_fail_marker" />
  </False>
</Action>
```



```
<Action Id="show_ok_marker">
  <Expression>okMarker->setHidden(false)</Expression>
  <Expression>marker_timer->start()</Expression>
</Action>
```



```
<Variable Id="marker_timer" Type="Object">
  <Reference>
    <Timer Id="marker_timer" />
  </Reference>
</Variable>
```



```
<Timer Id="marker_timer">
  <!-- after 700 milliseconds -->
  <Call Action="break_tile" />
</Timer>
```



```
<Action Id="break_tile">
  <!-- if: current index < index of last tile -->
  <True>
    <Expression>index=index+1</Expression>
    <Expression>seqLayer->setTileIndex(clearIndex)</Expression>
  </True>
  <False>
    <Call Action="calc_result" />
    <Call Action="nextSlide" />
  </False>
</Action>
```



```

<ImageSequenceLayer Id="sequence_layer">
  <Handlers>
    <Change>
      <Call Action="tile_change" />
    </Change>
  </Handlers>
</ImageSequenceLayer>

```

```

<Action Id="tile_change">
  <Expression>temporal_Index=seqLayer->getTileIndex()</Expression>
  <!-- if: temporal_Index >= firstIndex -->
  <False>
    <Expression>break_timer->start()</Expression>
  </False>
  <True>
    <!-- Load the code of the key for the correct answer -->
    <Expression>keyIndex=temporal_Index-firstIndex</Expression>
    <Expression>answerKey=answerKeys->get(keyIndex)</Expression>
    <Expression>keysDisabled=false</Expression>
  </True>

```

```

<Variable Id="break_timer" Type="Object">
  <Reference>
    <Timer Id="break_timer" />
  </Reference>
</Variable>

```

```

<Timer Id="break_timer">
  <!-- after 500 miliseconds -->
  <Expression>seqLayer->setTileIndex(index)</Expression>
</Timer>

```

```

<ImageSequenceLayer Id="sequence_layer">
  <Handlers>
    <Change>
      <Call Action="tile_change" />
    </Change>
  </Handlers>
</ImageSequenceLayer>

```

```

<Action Id="tile_change">
  <Expression>temporal_Index=seqLayer->getTileIndex()</Expression>
  <!-- if: temporal_Index >= firstIndex -->
  <False>
    <Expression>break_timer->start()</Expression>
  </False>
  <True>
    <!-- Load the code of the key for the correct answer -->
    <Expression>keyIndex=temporal_Index-firstIndex</Expression>
    <Expression>answerKey=answerKeys->get(keyIndex)</Expression>
    <Expression>keysDisabled=false</Expression>
  </True>

```

```

<Handlers>
  <Shortcut Key="Left">
    <Expression>key=1</Expression>
    <Call Action="key_press" />
  </Shortcut>
  <Shortcut Key="Right">
    <Expression>key=2</Expression>
    <Call Action="key_press" />
  </Shortcut>
  <Shortcut Key="Up">
    <Expression>key=3</Expression>
    <Call Action="key_press" />
  </Shortcut>
  <Shortcut Key="Down">
    <Expression>key=4</Expression>
    <Call Action="key_press" />
  </Shortcut>
</Handlers>

```

```

<Action Id="key_press">

```