

Class 9: Semester Org Files (4/4): Exams and Assignments

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1 Exams Top-level Tree

Instructors can create content for exams as they would for lectures. Lists can be used to create multiple choice questions. See the Org mode manual for more information. To minimize redundancy, exams are designed to be modular and common elements are shared as much as possible. Furthermore, Org mode's property inheritance allows instructors to conveniently create answer keys to multiple choice questions and to export the exam with or without the keys.

As shown in the following example, there are two subtrees in the Org-Coursepack: one for the exam title page and another for the mid-term exam.

```
* Exams:Exams:
:PROPERTIES:
** Title Page
** Mid-Term Exam
```

1.1 :PROPERTIES:

The properties have general information common across exams, such as \LaTeX headers.

1.2 Title Page Subtree

The content of this subtree will be shared across exams via the `#+INCLUDE` statement. Instructors can include general information pertaining to exams (e.g., student code of conduct) in this page. Note that any information about a specific exam (e.g., exam date, exam time, number of questions) can be specified by passing property values to the `Title Page` subtree. For example, the exam time information uses the value of the property `TIME` using `{{property(TIME)}}`.

1.3 Exam subtree

The mid-term exam subtree in the Org-Coursepack has the following structure:

```
** Mid-Term Exam
:PROPERTIES:
*** 01
*** 02
*** Exam Content
```

Each exam has a separate subtree for each course section, and they will share common Exam Content.

1.3.1 :Properties:

Each exam subtree has properties containing information common across sections. See example below.

```
:PROPERTIES:
:CUSTOM_ID: Exam/1
:EXPORT_TITLE: Exam 1
:EXPORT_DATE:  {{{DATE_EXAM_1}}}
:TIME: 75 Minutes
:END:
```

1.4 Section Subtrees

Each exam in the Org-Coursepack has two section subtrees. Instructors may add additional sections. Each subtree has section-specific information about the exam in their :PROPERTIES:. Each section can have multiple versions of the same exam (e.g., A and B versions), with each version belonging to a separate subtree. The exam content includes a title page, multiple choice questions, and short answers. See the example and note below.

```
*** 01
:PROPERTIES:
:EXPORT_AUTHOR: {{{COURSE_NUM}}}-01: {{{COURSE}}}
:ANSWER:
:END:
**** A Type
:PROPERTIES:
#+INCLUDE: "2020 Spring.org::#Exam/Title Page" :only-contents t
***** Multiple Choice :newpage:
(2 points each, unless otherwise specified)
#+INCLUDE: "2020 Spring.org::#Exam/1/MC/A" :only-contents t
***** Short Answers :newpage:
#+INCLUDE: "2020 Spring.org::#Exam/1/Short Answers" :only-contents t
```

Note that the property `:ANSWER:` is empty. This is to hide answers for multiple choice questions—see Exam Contents/Multiple Choice for details.

1.5 Exam Content Subtree

The Exam Content subtree contains exam questions. Its content can be pulled in section-specific exam subtrees to create exams. The Exam Content subtree can also be used to create exam keys by exporting the version subtree (e.g., Type A (Key)) under Exam Content/Multiple Choice.

```
*** Exam Content
**** Multiple Choice
:PROPERTIES:
***** Type A (Key)
***** Type B (Key)
**** Short Answers                                     :newpage:
:PROPERTIES:
#+INCLUDE: "../.../Topics/Org_Teaching.org::#Question/SA" :only-contents t
```

1.6 Multiple Choice

The Org-Coursepack exams have two versions (type A and B). The two versions have the same multiple choice questions in the same order, but the choice options are in different orders.

To create a new version, an instructor may first create a duplicate of the original version subtree and use the Alt+Up or Alt+Down keys on the choice options to change their orders. Pressing C-c C-c automatically re-numbers the items in the list.

The example below shows a subset of content in the Multiple Choice tree.

```
**** Multiple Choice
:PROPERTIES:
:ANSWER: \checkmark
:END:
***** Type A (Key)
:PROPERTIES:

1. Which of the following is a vegetable?
  1. Okra
  2. Carrot {{{property(ANSWER)}}}
  3. Eggplant
  4. Pepper

***** Type B (Key)
:PROPERTIES:
```

1. Which of the following is a vegetable?
 1. Okra
 2. Pepper
 3. Eggplant
 4. Carrot {{{property(ANSWER)}}}

The answer to each multiple choice question is marked with the macro {{{property(ANSWER)}}} and the Multiple Choice tree has the property of :ANSWER: \checkmark. Hence, an instructor can export the version subtree (e.g., Type A (Key)) to obtain the answer keys, with correct answers marked by a checkmark symbol.

1.7 Short Answers

Since open-ended questions do not typically require multiple versions, one can have such questions in the corresponding topic Org file (e.g., under the Questions top-level tree) and include them here.

2 Assignments Top-level Tree

- Instructors can create assignments as they do lecture content using Org mode.
- Assignment instructions may be created in the Assignments top-level tree of a topic Org file, which are then included here.
- See Org_Teaching/2020 Spring/2020 Spring.org for an example.

3 Local Variables Top-level Tree

Local variables top-level tree has file-local variables. See the Emacs manual for more information. File-local variables include the options to (a) skip confirmation on running elisp-link functions (org-confirm-elisp-link-function nil), (b) allow property inheritance (org-use-property-inheritance: t), which is important for many functionalities of the Org-Coursepack to work properly, and (c) change the default timestamp format.

The following shows the content of this subtree.

```
# Local Variables:
# org-confirm-elisp-link-function: nil
# org-export-babel-evaluate: 'inline-only
# org-use-property-inheritance: t
# org-time-stamp-custom-formats: ("<%a, %b %d, %Y>" . "<%a, %b %d, %Y %l:%M%p>")
# org-latex-active-timestamp-format: "%s"
# org-latex-inactive-timestamp-format: "%s"
# End:
```