University of Zurich[UZH]

S3IT

Running tasks in parallel: `ParallelTaskCollection`

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Basic use of ParallelTaskCollection

```
from gc3libs.workflow \
  import ParallelTaskCollection

class MyTasks (ParallelTaskCollection) :
  # ...
  def __init__(self, ...):
    app1 = AnApp(...)
    app2 = AnotherApp(...)
    # ...
    appN = YetAnotherApp(...)
    ParallelTaskCollection.__init__(
      self, [app1, app2, ..., appN])
```

A `ParallelTaskCollection` runs a list of tasks, submitting at the same time as many as possible.

Basic use of ParallelTaskCollection

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  # ...
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      self, [app1, app2, ..., appN])
```

Initialize a `ParallelTaskCollection` with a list of tasks to run.

Running tasks in parallel

```
class MyScript(SessionBasedScript):
  # ...
  def new_tasks(self, extra):
    tasks_to_run = [
      MyTasks(...)
    ]
    return tasks_to_run
```

You can then run the entire collection by returning it from `new_tasks()`, or by using it as a step in an outer `SequentialTaskCollection`.

Detour: random colors

ImageMagick allows specifying colors also by the syntax `xc:#`*rgb* where *r*, *g*, and *b* are 2-digit hexadecimal numbers ranging from `00` to `ff`.

For example, `#ffa500` is the "orange" color.

You can generate these color specifications randomly from Python by combining string formatting and the `randint` function:

```
def random_color():
    from random import randint
    r = randint(0, 255)
    g = randint(0, 255)
    b = randint(0, 255)
    color = ("xc:#%02x%02x%02x" % (r, g, b))
    return color
```

Exercise 9.A: Write a `RandomlyColorize` task collection class (subclass of `ParallelTaskCollection`) that is initialized with two parameters: an image file name `img` and a number `N`.

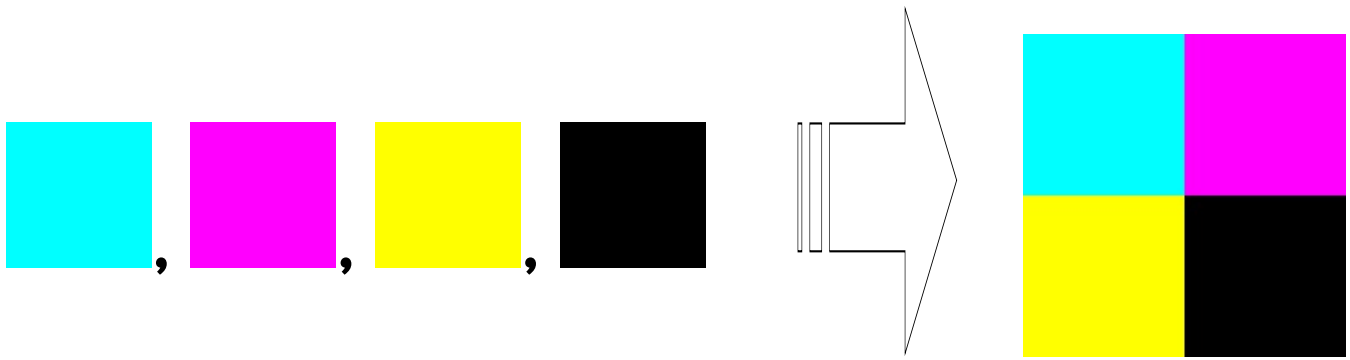
The `RandomlyColorize` collection then consists of `N` instances of the `ColorizeApp`, each initialized with the same image file name `img` and three random colors.

Exercise 9.B: Modify the `RandomlyColorize` class from Exercise 9.A to:

1. take an additional parameter `tolerance` (a number from 0.0 to 100.0)
2. upon termination of all tasks in the collection, set the collection's exit code to 0 (success) if at the percentage of failed jobs is less than `tolerance`; set the exit code to 1 otherwise.

Detour: image montage

```
$ montage \
    cyan.jpg magenta.jpg yellow.jpg black.jpg \
    -tile 2x2 -geometry +0+0 cmyk.jpg
```



Write your own "Warholize" workflow!

Exercise 9.C: Write a `WarholizeScript` session-based script.

The script takes any number of image file names as arguments; each image undergoes the following processing steps:

1. Conversion to grayscale;
2. From the grayscaled version, N^2 randomly-colored new images are formed;
3. These N^2 tiles are arranged in a $N \times N$ grid, which is the final result of the processing pipeline.

A command-line option `--size` allows one to set the value of N, with default $N = 2$.