

CS799 Ridiculously Advanced Systems Project Report

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Abstract

This document is a simple template for a typical term or semester paper (lab/course report, “Übungsbericht”, etc.) based on the `HagenbergThesis` LaTeX package.¹ The structure and chapter titles have been formulated to provide a good starting point for a typical *project report*. This document uses the custom class `hgbreport` which is based on LaTeX’s standard `report` document class with `chapter` as the top structuring element. If you wish to write this report in German you should substitute the line

```
\documentclass[english]{hgbreport}
```

at the top of this document by

```
\documentclass[german]{hgbreport}.
```

To omit the default **title page** (as in this document) use the `notitlepage` option, e.g.,

```
\documentclass[notitlepage,english]{hgbreport}.
```

Also, you may want to place the text of the individual chapters in separate files and include them using `\include{..}`.

Use the abstract to provide a short summary of the contents in the document.

¹See <https://github.com/Digital-Media/HagenbergThesis> for the most current version and additional examples. This repository also provides a good introduction and useful hints for authoring academic texts with LaTeX.

Chapter 1

Algorithm test

Algorithm 1.1: Bikubische Interpolation in 2D. Die Funktion $w_{\text{cub}}()$ steht für die eindimensionale kubische Interpolationsfunktion (Zeile 8).

```
1: BICUBICINTERPOLATION( $I, x, y$ ) ▷  $x, y \in \mathbb{R}$ 
   Input:
   Returns the interpolated value of the image  $I$  at the continuous position  $(x, y)$ .
2:    $val \leftarrow 0$ 
3:   for  $j \leftarrow 0, \dots, 3$  do ▷ iterate over 4 lines
4:      $v \leftarrow \lfloor y \rfloor - 1 + j$ 
5:      $p \leftarrow 0$ 
6:     for  $i \leftarrow 0, \dots, 3$  do ▷ iterate over 4 columns
7:        $u \leftarrow \lfloor x \rfloor - 1 + i$ 
8:        $p \leftarrow p + I(u, v) \cdot w_{\text{cub}}(x - u)$ 
9:     end for
10:     $val \leftarrow val + p \cdot w_{\text{cub}}(y - v)$ 
11:  end for
12:  return  $val$ 
13: end
```

Algorithm 1.2: Finds a minimum makespan role assignment. This function is the MMDR $O(n^5)$ polynomial time implementation, as described by McAlpine et al. It rearranges target positions T so that their index corresponds with the indices of their assigned agents.

```

1: ROLEASSIGNMENT( $A, T$ )
   Input:  $A = (\mathbf{a}_0, \dots, \mathbf{a}_{n-1})$ ,  $T = (\mathbf{t}_0, \dots, \mathbf{t}_{n-1})$ , where  $\mathbf{a}_i = (x_i, y_i)$ ,  $\mathbf{t}_j = (x_j, y_j)$ .
   Returns  $T' = (\mathbf{t}'_0, \dots, \mathbf{t}'_{n-1})$ , a permutation of  $T$ .
   StateNN[1]: Very long texts should have the same indentation should have the same indentation should have the same indentation should have the same indentation should have the same indentation.
2:   State
   StateNN (no arg): leftmargin = 18.61494pt, listparindent = 21.9pt, labelwidth = 13.13995pt
   StateNN[1]
   StateXX[2] leftmargin = 18.61494pt, listparindent = 21.9pt, labelwidth = 13.13995pt
   Very long texts should have the same indentation should have the same indentation should have the same indentation should have the same indentation should have the same indentation.
   StatexIndent
3:   State
   Statex
   StateY
   item[]
   ▷ no need to explore more. we just want to stop over here.
4:    $edgesSorted \leftarrow \text{SORTASCENDINGDIST}(Edges)$ 
5:    $lastDistance \leftarrow -1$ 
6:    $rank \leftarrow 0$ 
7:    $currentIndex \leftarrow 0$ 
   Process sorted edges (INDENTATION PROBLEM): 2
8:   for  $e \in edgesSorted$  do
   ▷ no need to explore more. we just want to stop over here. 2
9:     if  $\|e\| > lastDistance$  then 32.84998pt 3
10:      State 49.27496pt 4
      ▷ no need to explore more 49.27496pt
      StateY
      StateNN
      StatexIndent
   Statex 4
   item[] 4
11:     $rank \leftarrow currentIndex$  4
12:    end if
13:     $lastDistance \leftarrow \|e\|$  3
14:     $\|e\| \leftarrow 2^{rank}$ 
15:     $currentIndex \leftarrow currentIndex + 1$ 
16:    finally 3
17:  end for
18:   $perfectMatching \leftarrow \text{HUNGARIANALG}(edgesSorted)$  ▷ returns a set of edges
19: end

```
