Implementing a scheduling Website using heuristic algorithms

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## Aim

1. To select or develop a heuristic algorithm to address a resource allocation and scheduling problem that occurs in bio-technology automation platform.
2. To implement a web application that accepts problem inputs and displays a color coded Gantt chart obtained as a result of running the heuristic algorithm

## Use Cases

* Accept Scheduling Parameters
  + Number of types of Machines
  + Number of machines available for each type
  + Number of unique sequences of actions to be scheduled
  + Each of the unique sequences of actions and their durations
* Run Scheduling Routine
* Display Results
  + Gantt Chart Mode
  + Text Mode
* Select Algorithm Parameters [Admin]
* View Algorithm Run Logs [Admin]

## Tools and Technology

* Microsoft Visual Studio 2010
* Microsoft ASP.NET MVC 2.0
* Microsoft C#
* Microsoft SQL Server 2008 R2
* CSS, Java Script, AJAX, etc.

## Benefits to participants

* Gain insights into the subjects of Combinatorics, Optimization, Heuristics Algorithms, and Graph Traversal Algorithms
* Benefit from learning Industry’s leading technology platform – ASP.NET
* Benefit from domain knowledge gained through interactions with our company
* Being part of an aggressive start-up culture

## Approach

* Ansh Labs will provide **domain knowledge** to the students through discussion sessions and relevant publications.
* Students will research different papers and **choose an algorithm** that best fits the requirements.
* Students will **analyze requirements** and create a high-level architecture (Architecture Diagram)
* Students will design components based on the architecture above such as Core Algorithms, Input Management, etc. (Design Diagram)
* Students will then start development along with test cases based on the design created above. (Code)
* Using CruiseControl.Net, each build will be tested and report will be generated.

## Meetings

* Students can meet their mentor once a week to discuss progress and any questions pertaining to the project or domain knowledge.
* Student’s active participation in providing ideas and resolutions will see benefit in final grading.

## Example Paper

Jie Zhu, Xiaoping Li, Qian Wang, *Complete local search with limited memory algorithm for no-wait job shops to minimize makespan*, European Journal of Operational Research, <http://ideas.repec.org/a/eee/ejores/v198y2009i2p378-386.html>