

UNIVERSIDAD SIMÓN BOLÍVAR DECANATO DE ESTUDIOS PROFESIONALES COORDINACIÓN DE INGENIERÍA DE LA COMPUTACIÓN

DESARROLLO DEL MÓDULO PRINCIPAL Y ESTADÍSTICAS DE LA LIBRERÍA AUDITORÍAS TURPIAL

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INFORME DE PASANTÍA

Presentado ante la Ilustre Universidad Simón Bolívar como requisito parcial para optar al título de Ingeniero de la Computación

RESUMEN

Este es el resumen

DEDICATORIA

RECONOCIMIENTOS Y AGRADECIMIENTOS

First of all, I would like to thank

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LISTA DE SÍMBOLOS

símbolos

LISTA DE ABREVIACIONES

VIM Variational Iteration Method

MVIM Multistage Variational Iteration Method

ODEs Ordinary Differential Equations
PDEs Partial Differential Equations

 λ Lagrange Multiplier

ADM Adomian Decomposition Method

SADM Standard Adomian Decomposition Method MADM Modified Adomian Decomposition Method

RK4 Fourth-order Runge-Kutta Method

HAM Homotopy Analysis Method

INTRODUCCIÓN

Implementar, probar y presentar las funcionalidades de selección, gestión y listados de auditorías y todas las funcionalidades del módulo Estadísticas de la librería de Auditorías Turpial e implantar un sistema de integración continua con el repositorio.

Entorno empresarial

- 1.1 Descripción
- 1.2 Misión
- 1.3 Visión
- 1.4 Estructura

Definición del problema

- 2.1 Antecedentes
- 2.2 Justificación
- 2.3 Planteamiento del problema
- 2.4 Objetivo general
- 2.5 Objetivos específicos

Marco teórico

- 3.1 Auditoría
- 3.2 Acciones auditables
- 3.3 Sistema
- 3.4 Microservicio
- 3.5 Integración Contínua
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- 3.16 Señales
- 3.17 Mixins
- 3.18 Turpial Team

Marco tecnológico

4.1	Python
	1 , 011011

- 4.2 Virtualenv
- 4.3 Django
- 4.4 HTML
- 4.5 Javascript
- 4.6 Pytest
- 4.7 Django-Graphos o Chart.js
- 4.8 PostgreSQL
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- 4.12 Git
- 4.13 Jenkins

Marco metodológico

Desarrollo

- 6.1 Fase de investigación
- 6.2 Fase de concepción
- 6.3 Fase de construcción del núcleo
- 6.4 Fase de construcción del módulo de estadísticas
- 6.5 Fase de transición

CONCLUSIONES

Conclusiones

Recomendaciones

REFERENCIAS

APPENDIX

ALGORITHMS

.0 Simulated Annealing

```
Random decimal numbers g to a and T to T_0
Loop - Cooling
Loop - Local Search
Derive a neighbour, j of i
\triangle E := E(j) - E(i)
If \triangle E < 0
Then i := j
Else derive random number r \in [0, 1]
If r < e^{-\frac{\Delta E}{T}}
Then i := j
End If
End If
End Loop - Local Search
Exit (when goal is satisfied or the stopping criterion is reached)
T = C(T)
End Loop - Cooling
```

Figure 1: Algorithm of Simulated Annealing

.1 Genetic Algorithm

- **S1:** [Start] Generate an initial population P_{pop} , of n chromosomes.
- **S2:** [Fitness] Evaluate the fitness g(x) of each chromosome x in the population.
- **S3:** [New Population] Create a new population by repeating the following steps until the new population is complete.
 - i. [Selection] Select 2 parent chromosomes from a population according to their fitness (the fitter, the better chance of being selected).
 - ii. [Crossover] With a crossover probability p_c , cross over the parents to form 2 new offspring (children). If no crossover was performed, the offspring is an exact copy of parents.
 - iii. [Mutation] With a mutation probability p_m , mutate new offspring at each locus (position in chromosome).
 - iv. [Replace] Place new offspring in the new population.
- **S4:** [Fitness] Evaluate the fitness g(x') of each chromosome x' in the new population.
- **S5:** [**Test**] If the end condition is satisfied, **STOP**, and return the fittest solution found; otherwise, go to **S3**.

Figure 2: Algorithm of a Genetic Algorithm

.2 Tabu Search

```
{\bf procedure} \ {\bf SEARCH}(t,k,diversify,z) :
      penalty^* := +\infty;
      for each j \in S_t do
             for each k-tuple K of bins not including t do
                   S := \{j\} \cup (\bigcup_{i \in K} S_i);
                   penalty := +\infty;
                   case
                          A(S) < k:
                                 execute the move and update the solution value z;
                                 k := \max\{1, k-1\};
                                 return;
                          A(S) = k:
                                 if the move is not tabu or S_t \equiv \{j\} then
                                       execute the move and update the solution value z;
                                       if S_t \equiv \{j\} then k := \max\{1, k - 1\};
                                       return
                                 end if;
                          A(S) = k + 1 and k > 1:
                                 let I be the set of k+1 bins used by A;
                                 \overline{t} := \arg\min_{i \in I} \{ \varphi(Si) \}, \ T := (S_t \setminus \{j\}) \cup S_{\overline{t}};
                                 if A(T) = 1 and the move is not tabu then
                                       penalty := \min\{\varphi(T), \min_{i \in I \setminus \{\overline{t}\}} \{\varphi(S_i)\}\}
                   end case;
                   penalty^* := \min\{penalty^*, penalty\};
             end for;
      end for;
      if penalty^* \neq +\infty then execute the move corresponding to penalty^*
      else if k = k_{\max} then diversify := \mathsf{true} else k := k + 1
```

Figure 3: Unified Tabu Search: Procedure SEARCH

APPENDIX A

TABLES

A.1 Complex Tables

Example of complex table ...e.g. Table A.1

Table A.1: Typology of Machine Scheduling Problems

Characteristic	Symbol	Description								
	$\alpha_1 = \circ$	a single machine								
	$\alpha_1 = P$	identical parallel machines								
	$\alpha_1 = Q$	uniform parallel machines								
Machine	$\alpha_1 = R$	unrelated parallel machines								
Environment	$\alpha_1 = F$	a flow shop								
α	$\alpha_1 = O$	an open shop								
	$\alpha_1 = J$	a job shop								
	$\alpha_2 = \circ$	the number of machines is arbitrary								
	$\alpha_2 = m$	there are a fixed number of machines m								
	$\beta_1 = \circ$	no release dates are specified								
	$\beta_1 = r_j$ $\beta_2 = \circ$	jobs have release dates								
	$\beta_2 = \circ$	no deadlines are specified								
	$\beta_2 = \bar{d}_j$ $\beta_3 = \circ$	jobs have deadlines								
Job	$\beta_3 = \circ$	there are no setup times								
Characteristics	$\beta_3 = s_{ifg}$	there are general family setup times								
β	$\beta_3 = s_{fg}$	there are machine independent family setup times								
	$\beta_3 = s_{if}$	there are sequence independent family setup times								
	$\beta_3 = s_f$ $\beta_4 = \circ$	there are machine and sequence independent family setup times								
		no precedence constraints are specified								
	$\beta_4 = prec$	jobs have precedence constraints								
	$\beta_4 = pmtn$	preemption of jobs is allowed								
Optimality	C_{\max}	maximum completion time								
Criterion	L_{\max}	maximum lateness								
γ	$\sum (w_j)C_j$	total (weighted) completion time								
	$\sum_{j}^{max} (w_j) C_j$ $\sum_{j}^{j} (w_j) T_j$ $\sum_{j}^{j} (w_j) U_j$ $\sum_{j}^{j} (w_j) E_j$	total (weighted) tardiness								
(involves the	$\sum_{j}^{J}(w_{j})U_{j}$	total (weighted) number of late jobs								
minimisation of)	$\sum_{j}^{J}(w_{j})E_{j}$	total (weighted) earliness								

Example of landscape (or sideway) table . . . e.g. Table A.2

Table A.2: A Comparison of Different Local Search Algorithms

\mathbf{RDM}			65.36	73.23	61.77		73.53	73.53	73.53 55.34 77.10	73.53 55.34 77.10 76.41	73.53 55.34 77.10 76.41 43.17	73.53 55.34 77.10 76.41 43.17 74.93	73.53 55.34 77.10 76.41 43.17 74.93 67.96	73.53 55.34 77.10 76.41 43.17 74.93 67.96	73.53 55.34 77.10 76.41 43.17 74.93 67.96 63.68	73.53 55.34 77.10 76.41 43.17 74.93 67.96 63.68 71.50	73.53 55.34 77.10 76.41 43.17 74.93 67.96 63.68 63.68 71.50	73.53 55.34 77.10 76.41 43.17 74.93 67.96 63.68 63.68 71.50 59.22 71.59	73.53 55.34 77.10 76.41 43.17 74.93 67.96 63.68 63.68 71.50 59.22 71.59	73.53 55.34 77.10 76.41 43.17 74.93 67.96 63.68 71.50 55.00 55.00	73.53 55.34 77.10 76.41 43.17 74.93 67.96 67.96 63.68 71.50 59.22 71.59 55.00 74.28	73.53 55.34 77.10 76.41 43.17 74.93 67.96 67.96 63.68 71.50 59.22 71.50 59.22 71.50 59.22 71.59 74.28 74.28	73.53 55.34 77.10 76.41 43.17 74.93 67.96 63.68 71.50 59.22 71.50 55.00 74.28 74.28 74.28 74.28 74.27 74.27	73.53 55.34 77.10 76.41 43.17 74.93 67.96 67.96 63.68 71.50 59.22 71.50 59.22 71.59 55.00 74.28 74.28 74.28 74.28 74.27 74.28	73.53 55.34 77.10 76.41 43.17 78.46 67.96 63.68 71.50 59.22 71.59 74.28 74.27 74.28 74.27 74.28 74.27 74.28 74.27 74.28 74.27 74.28 74.27 74.28 74.27 74.28 74.27 74.28 74.27 74.28 74.27 74.28 74.27 74.28 74.27 74.28 74.27 74.28 74.27 74.28 74.27 74.28 74.27 74.27 74.28 74.27	73.53 55.34 77.10 76.41 43.17 74.93 67.96 67.96 63.68 71.50 59.22 71.50 59.22 71.59 74.28 74.28 74.28 74.28 74.20 77.20 77	73.53 55.34 77.10 76.41 43.17 74.93 67.96 63.68 71.50 59.22 71.59 55.00 74.28 74.28 74.28 74.27 74.28 74.27 74.27 66.45 66.45 66.45 66.45	73.53 55.34 77.10 76.41 43.17 74.93 67.96 63.68 71.50 59.22 71.59 55.00 74.28 74.28 74.28 74.28 74.28 74.28 74.28 74.28 74.28 74.28 74.28 74.28 74.28 74.28 76.40 66.45 66	73.53 55.34 77.10 76.41 43.17 74.93 67.96 63.68 71.50 59.22 71.59 55.00 74.28 75 75 76 76 76 76 76 76 76 76 76 76 76 76 76	73.53 55.34 77.10 76.41 43.17 78.46 63.68 71.50 55.00 74.28 74.28 74.27 73.23 66.45 66.45 66.45 69.10 69.10 69.10	73.53 55.34 77.10 76.41 43.17 74.93 67.96 63.68 71.50 59.22 71.59 55.00 74.28 74.28 74.28 74.28 74.28 74.28 74.27 66.45 66.45 66.45 69.10 69.10 69.10	73.53 75.34 77.10 76.41 43.17 74.93 67.96 63.68 71.59 55.00 74.28 74.28 74.28 74.28 74.28 74.28 74.28 74.28 74.28 74.28 74.28 76.50 63.68 76.50 63.68 76.50 76	73.53 77.10 76.41 43.17 74.93 67.96 67.96 63.68 71.59 71.59 71.59 71.59 74.27 74.28 74.28 74.27 74.28 74.28 74.29 76.50 66.45 66.45 66.45 66.45 66.45 66.45 66.45 66.46 66.45 66	73.53 75.34 77.10 76.41 43.17 74.93 67.96 67.96 63.68 71.59 55.00 74.27 71.59 55.00 74.28 74.28 74.28 74.28 74.28 74.28 74.28 74.28 74.28 74.29 66.45 66.45 66.45 66.46 66.45 66.46 66.45 76.50 66.48 66.38 77.77 77
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	ARD	16.58	17.38	30.86	21.74	24.24	23.23	33.78	0.00	33.96	33.96	33.96 1.68 27.90	33.96 1.68 27.90 23.10	33.96 1.68 27.90 23.10	33.96 1.68 27.90 23.10 34.93 47.72	33.96 1.68 27.90 23.10 34.93 47.72 66.78	33.96 1.68 27.90 23.10 34.93 47.72 66.78 53.45	33.96 1.68 27.90 23.10 47.72 66.78 66.78 48.58	3.3.96 1.68 2.7.90 2.3.10 2.3.10 2.3.10 4.7.72 66.78 53.45 48.58 48.85	33.96 1.68 27.90 23.10 23.10 23.10 47.72 66.78 53.45 48.58 48.85 48.85 71.94	33.96 1.68 27.90 23.10 23.10 23.10 47.72 66.78 53.45 48.58 48.85 72.72	33.96 1.68 27.90 23.10 23.10 23.10 24.93 47.72 66.78 53.45 48.58 71.94 72.72 72.72	33.96 1.68 27.90 23.10 23.10 23.10 23.10 47.72 66.78 53.45 48.58 71.94 72.72 2.42 67.45	33.96 1.68 27.90 23.10 23.10 23.45 47.72 66.78 53.45 48.85 71.94 72.72 72.72 72.72 72.42 67.45	33.96 1.68 27.90 23.10 23.10 23.10 23.45 47.72 66.78 48.85 71.94 72.72 72.	33.96 1.68 27.90 23.10 23.10 23.10 23.20 23.20 23.20	33.96 1.68 27.90 23.10 23.10 23.10 24.93 48.58 48.58 48.85 71.94 72.72 72.72 71.94 72.72 66.745 67.45 67	33.96 1.68 27.90 23.10 23.10 23.10 23.10 47.72 66.78 53.45 48.85 71.94 72.72 2.42 67.45 67.4	33.96 1.68 27.90 23.10 23.10 34.93 47.72 66.78 66.78 48.85 71.94 72.72 2.42 67.45 67.45 61.48 136.69 136.69 180.45 180.45	33.96 1.68 27.90 23.10 23.10 34.93 47.72 66.78 66.78 66.78 48.85 71.94 72.72 24.22 67.45 67.	3.3.96 1.68 27.90 23.10 23.10 34.93 47.72 66.78 48.85 72.72 242 67.45 67.45 61.48 61.48 61.48 61.48 61.48 62.42 62.42 62.42 63.63 63.6	33.96 1.68 27.90 23.10 23.10 23.10 23.45 48.85 71.94 72.72 242 67.45	33.96 1.68 27.90 23.10 23.10 23.10 23.45 48.85 48.85 71.94 72.72 242 67.45	33.96 1.68 27.90 23.10 23.10 23.10 23.45 48.85 48.85 48.85 71.94 72.72 2.42 67.45 67.45 67.45 61.48 136.69 180.45 223.20 180.45 223.21 149.25 274.92 274.92 275.93 276.93 396.65
SGA	OBU	83.10	63.69	71.36	89.09	72.45	54.51	74.45	74.14		44.07	44.07 74.96	44.07 74.96 67.34	44.07 74.96 67.34 81.82	44.07 74.96 67.34 81.82 63.61	44.07 74.96 67.34 81.82 63.61 68.91	44.07 74.96 67.34 81.82 63.61 68.91 59.27	44.07 74.96 67.34 81.82 63.61 68.91 59.27 69.66	44.07 74.96 67.34 81.82 63.61 68.91 59.27 69.66 54.34	44.07 74.96 67.34 81.82 63.61 68.91 59.27 69.66 54.34 72.88	44.07 74.96 67.34 63.61 68.91 69.66 54.34 72.88	44.07 74.96 67.34 81.82 63.61 68.91 59.27 69.66 54.34 72.19 43.84	44.07 74.96 67.34 63.61 68.91 69.66 54.34 72.19 43.84 73.38	44.07 74.96 67.34 81.82 63.61 68.91 68.91 69.66 54.34 72.88 72.19 43.84 73.38	44.07 74.96 67.34 63.61 68.91 68.91 68.91 69.66 54.34 72.88 72.88 72.19 43.84 73.38	44.07 74.96 67.34 63.61 68.91 68.91 69.66 69.66 54.34 72.88 72.88 72.19 43.84 72.19 73.38 65.99 65.99	44.07 74.96 67.34 63.61 68.91 68.91 69.66 54.34 72.19 72.19 73.38 65.99 65.80	44.07 74.96 67.34 81.82 63.61 68.91 68.91 68.91 72.88 72.88 72.88 72.39 65.99 65.99 65.80 65.80	44.07 74.96 67.34 81.82 63.61 68.91 69.66 54.34 72.88 72.19 43.84 73.38 65.99 65.99 65.99 65.80 65.80 67.32	44.07 74.96 67.34 81.82 63.61 68.91 68.91 69.66 54.34 72.88 72.19 43.84 73.88 72.19 65.99 65.99 65.80	44.07 74.96 67.34 81.82 63.61 68.91 68.91 68.91 72.88 72.19 43.84 72.88 72.19 65.99 65.99 65.99 65.80 65.80 67.32 70.18	44.07 74.96 67.34 81.82 63.61 68.91 68.91 72.88 72.19 43.84 72.38 65.99 65.99 65.99 65.99 65.80 65.80 65.80 65.80 65.81 70.18	44.07 74.96 67.34 81.82 63.61 68.91 68.91 72.88 72.19 72.88 72.19 72.88 72.38 65.99 65.99 65.99 65.90 65.90 65.80	44.07 74.96 67.34 81.82 63.61 68.91 68.91 72.88 72.19 43.84 72.38 72.38 65.99 65.99 65.90 65.90 65.90 65.90 65.90 77.33 65.90 65.90 65.90 65.90 77.33 65.90 65.90 65.90 65.90 77.33 65.90
	Ratio	1.056	1.033	1.109	1.047	1.087	1.110	1.120	1.125	1.007		1.099	1.099	1.099	1.099 1.079 1.065 1.033	1.099 1.079 1.065 1.033 1.132	1.099 1.065 1.033 1.132 1.060	1.099 1.065 1.033 1.132 1.060 1.060	1.099 1.065 1.033 1.132 1.060 1.113 1.113	1.099 1.065 1.065 1.033 1.132 1.060 1.113 1.113	1.099 1.065 1.033 1.132 1.060 1.113 1.113 1.113 1.113	1.099 1.079 1.065 1.033 1.132 1.060 1.113 1.110 1.113 1.1143 1.007	1.099 1.079 1.065 1.033 1.132 1.060 1.113 1.110 1.143 1.007	1.099 1.079 1.065 1.033 1.132 1.060 1.113 1.110 1.143 1.007 1.007	1.099 1.079 1.065 1.033 1.132 1.060 1.113 1.113 1.007 1.007 1.035	1.099 1.079 1.065 1.033 1.132 1.060 1.113 1.113 1.007 1.085 1.085	1.099 1.079 1.065 1.033 1.132 1.113 1.110 1.133 1.143 1.007 1.113 1.007 1.007 1.085 1.050	1.099 1.065 1.065 1.083 1.132 1.113 1.110 1.113 1.007 1.113 1.091 1.091 1.091 1.085 1.050 1.050	1.099 1.079 1.065 1.083 1.132 1.113 1.110 1.113 1.007 1.113 1.085 1.050 1.050 1.164 1.070	1.099 1.079 1.065 1.083 1.132 1.060 1.113 1.104 1.113 1.007 1.113 1.085	1.099 1.079 1.065 1.033 1.132 1.060 1.113 1.007 1.113 1.007 1.113 1.085 1.085 1.085 1.085 1.085 1.081	1.099 1.065 1.033 1.132 1.060 1.113 1.107 1.113 1.007 1.113 1.085 1.050 1.050 1.050 1.050 1.134 1.051	1.099 1.065 1.033 1.132 1.060 1.113 1.107 1.113 1.007 1.108 1.085 1.050 1.050 1.164 1.050 1.164 1.050 1.164 1.050 1.164 1.050 1.164 1.050 1.164 1.050 1.164 1.050 1.164 1.050 1.164 1.050 1.164 1.050 1.164 1.050 1.164 1.050 1.164 1.050	1.099 1.079 1.065 1.033 1.132 1.060 1.113 1.007 1.108 1.085 1.085 1.085 1.050 1.164 1.050 1.164 1.173 1.050 1.164 1.173 1.050 1.164 1.173 1.050 1.164 1.173 1.050 1.164 1.050 1.164 1.173 1.050 1.164 1.050 1.164 1.050 1.164 1.050 1.164 1.050 1.164 1.050 1.164 1.050 1.164 1.050 1.164 1.050 1.164 1.050 1.164 1.050 1.164 1.050 1.164 1.050 1.164 1.050 1.164 1.050 1.164 1.050 1.164 1.050
	Class	Ι	=	H	Λ	>	VI	VII	VIII	ΙX	×		Average	age I	age I	rage I III	'age III IIII	age III III III III III III III III II I	age III III III IV V	age III III III III III III III III III I	age	age	age	age						1	1	1 1 1 1 1 1 1 1 1 1		
Due Date	Class					A						Azzer	10.15		DAU .			В	g m	М	М	В	В	B Average	B Aver	B	B Aver	B	B B Aver	B B C C	B Aver	Aver C C	Aver C C	A Aver