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Optimized Curricular Generator Using Genetic Algorithm

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Abstract— Timetables are the vital thing that are to be seen in schools and college.Presently,this timetables are made manually by the teachers itself.Generating a timetable is very hectic task as it need lots of patience, time and man-work in doing so.In order to deal with timetabling issues we are proposing a system which would generate timetable for the institute. Subjects and lectures will be scheduled accordingly to the possible constraints and given inputs and thus a timetable will be generated.So to reduce this man-work and to make timetable automatically on a single click we have made a "optimized curricular generator"

Keywords—*Optimized,Curricular,Timetable,Genetic Algorithm,Automatic,Generator.*

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I. INTRODUCTION

The advance of computing technology has provided the means for constructing intelligent systems. So in order to reduce the man-power and time the system "optimized curricular generator using genetic algorithm" has been proposed which will generate the time-table automatically.
Optimized curricular generator is the java based software used to generate the timetable for schools and colleges automatically in a single click and the solution will be the optimized solution.

In this software we will be taking the input from the user and depending on the input the timetable will be generated.and here we are taking the case of college.Thus on a single click after taking the inputs the timetable for four years will be generated on a single click.Here,we are generating the timetable by taking the input as subject-name,faculty-name with the subjects taken by them,credit of the subject,and number of class and labs allocated to each semester(for college).

The automatic timetable generation is an NP hard problem as there will be clashes found every time when the user decreases the number of class and lab input.Thus if the number of class and number of labs used for teaching is decreased then there will be clashes in the final time-table generated..If we allocate more number of class and labs then the final timetable generated will be the timetable generated will minimum clash.

For example:There are 2 class and 4 labs allocated to the four years of department.There are in total 18 subjects to be teached in total in 4 years respectively.The generated output will have clashes as there are less number of classes and more number of subjects to be teached in a particular time-slot.If same is to be teached in 4 classes the output generated will be the optimized one with no clash of the faculty and subject at the same time in class and lab hours in any of the department.

For generating the time table with optimized solution we are using the Genetic algorithm..

Genetic Algorithm: Genetic Algorithm (GA) is a search-based optimization technique based on the principles of Genetics and Natural Selection. It is frequently used to find optimal or near-optimal solutions to difficult problems which otherwise would take a lifetime to solve. It is frequently used to solve optimization problems, in research, and in machine learning.The basic structure of a GA is as follows −We start with an initial population (which may be generated at random or seeded by other heuristics), select parents from this population for mating. Apply crossover and mutation operators on the parents to generate new off-springs. And finally these off-springs replace the existing individuals in the population and the process repeats. In this way genetic algorithms actually try to mimic the human evolution to some extent.

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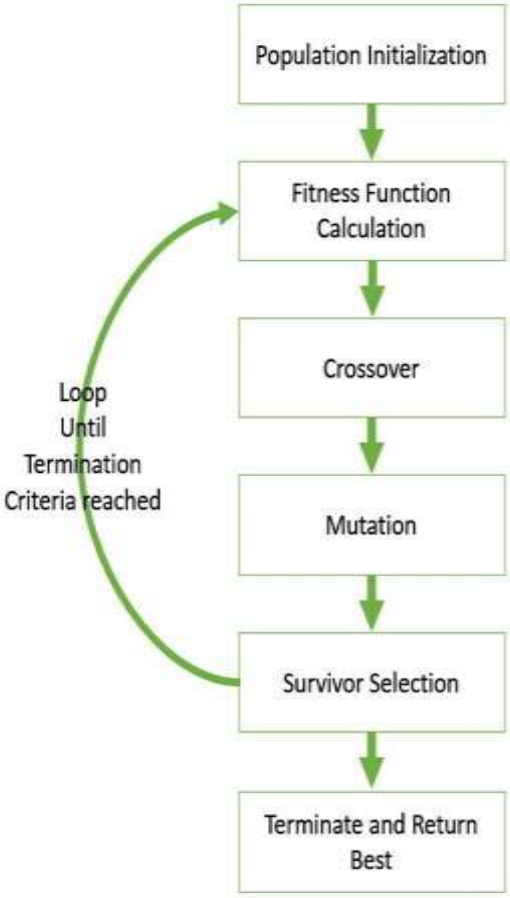


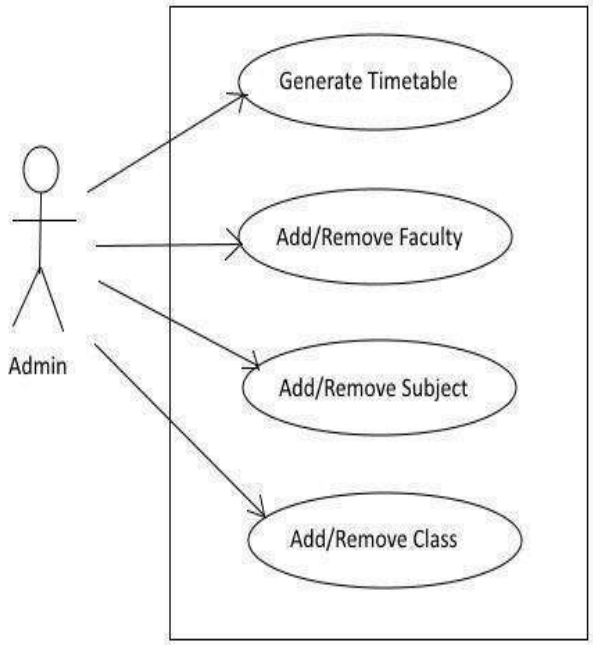
Figure:Genetic Algorithm

Thus as shown in the above algorithm the time table with optimized solution will be generated.

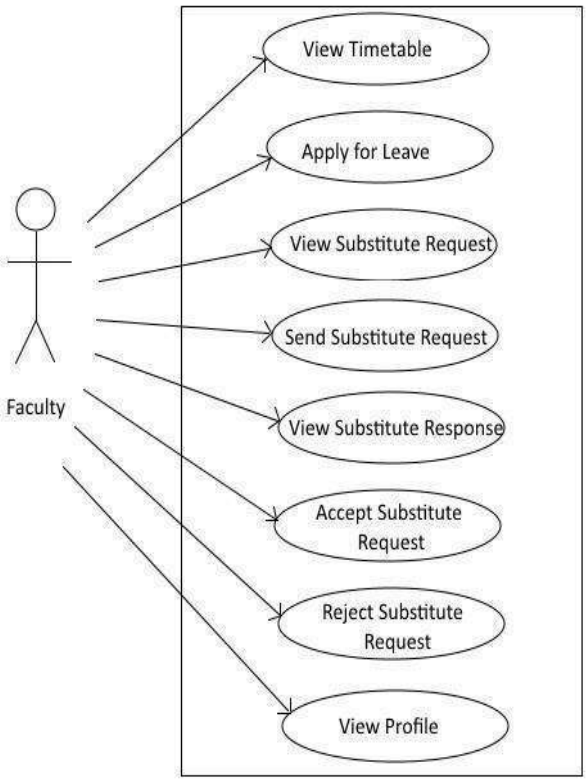
II. USE-CASE DIAGRAM

A use case diagram is a graphic depiction of the interactions among the elements of a system.
A use case is a methodology used in system analysis to recognize, clarify, and organize system requirements. In this context, the word "system" refers to something being developed or operated, such as a mail-order product sales and service Web site. Use case diagrams are employed in UML (Unified Modeling Language), a standard notation for the modeling of real-world things and systems.

This system is used by three types of user,
Admin : Admin can generate timetable and also can access the database of faculty, Subject,Class.



Faculty : Faculty can view the timetable, apply for leave, View/Send substitute request,Accept/Reject request.



Principal : Principal can view the timetable, View leave request, Approve/Reject leave.

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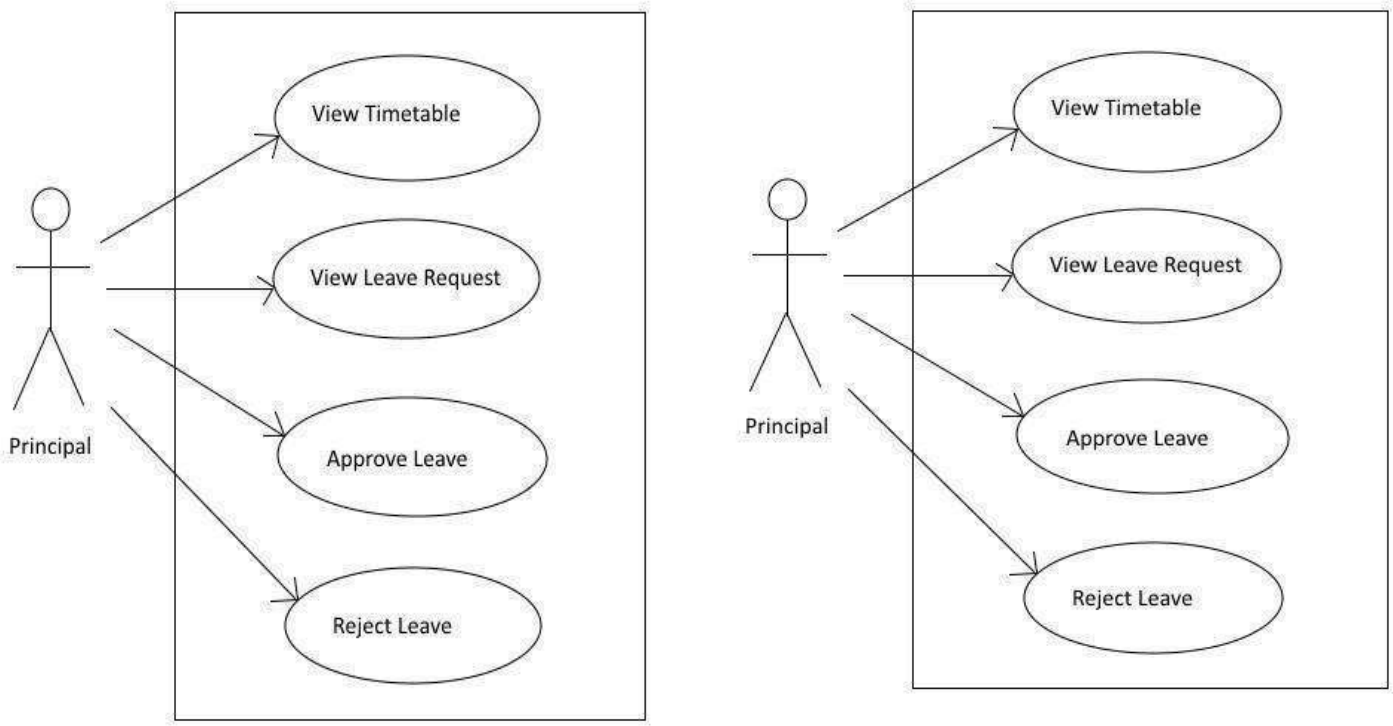
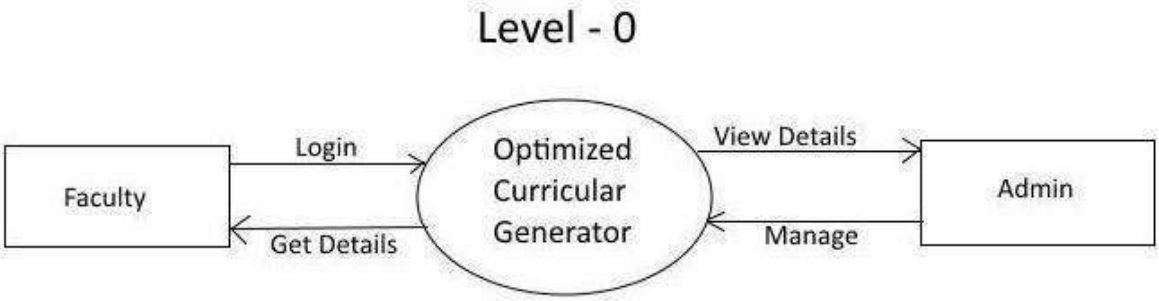
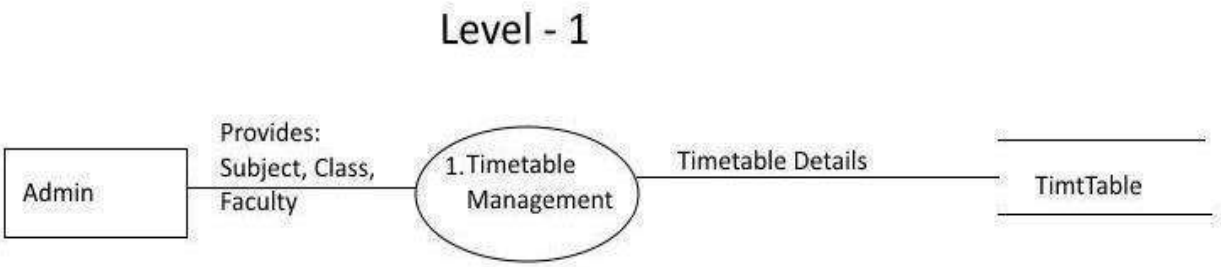


Data Flow Diagram (DFD):

1)Level – 0



2) Level -1



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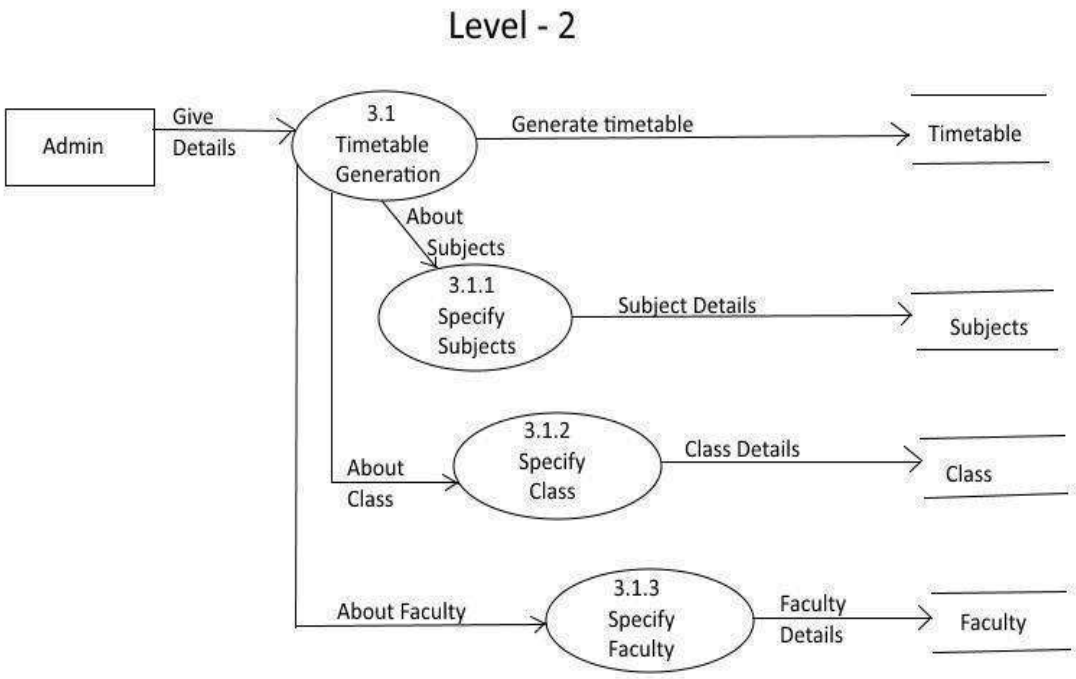
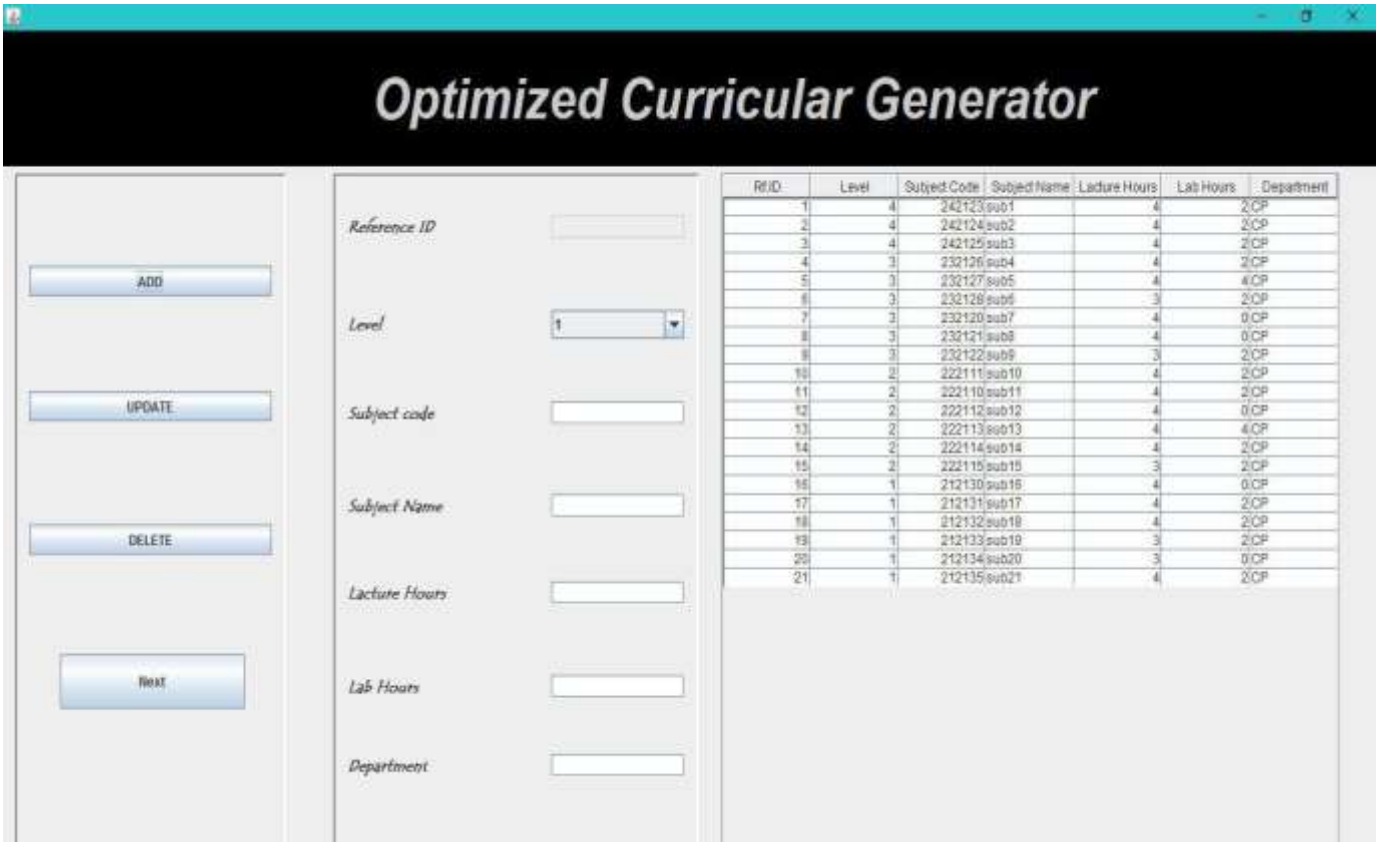
3) Level – 2



III. IMPLEMENTATION

INPUTS

Subject:



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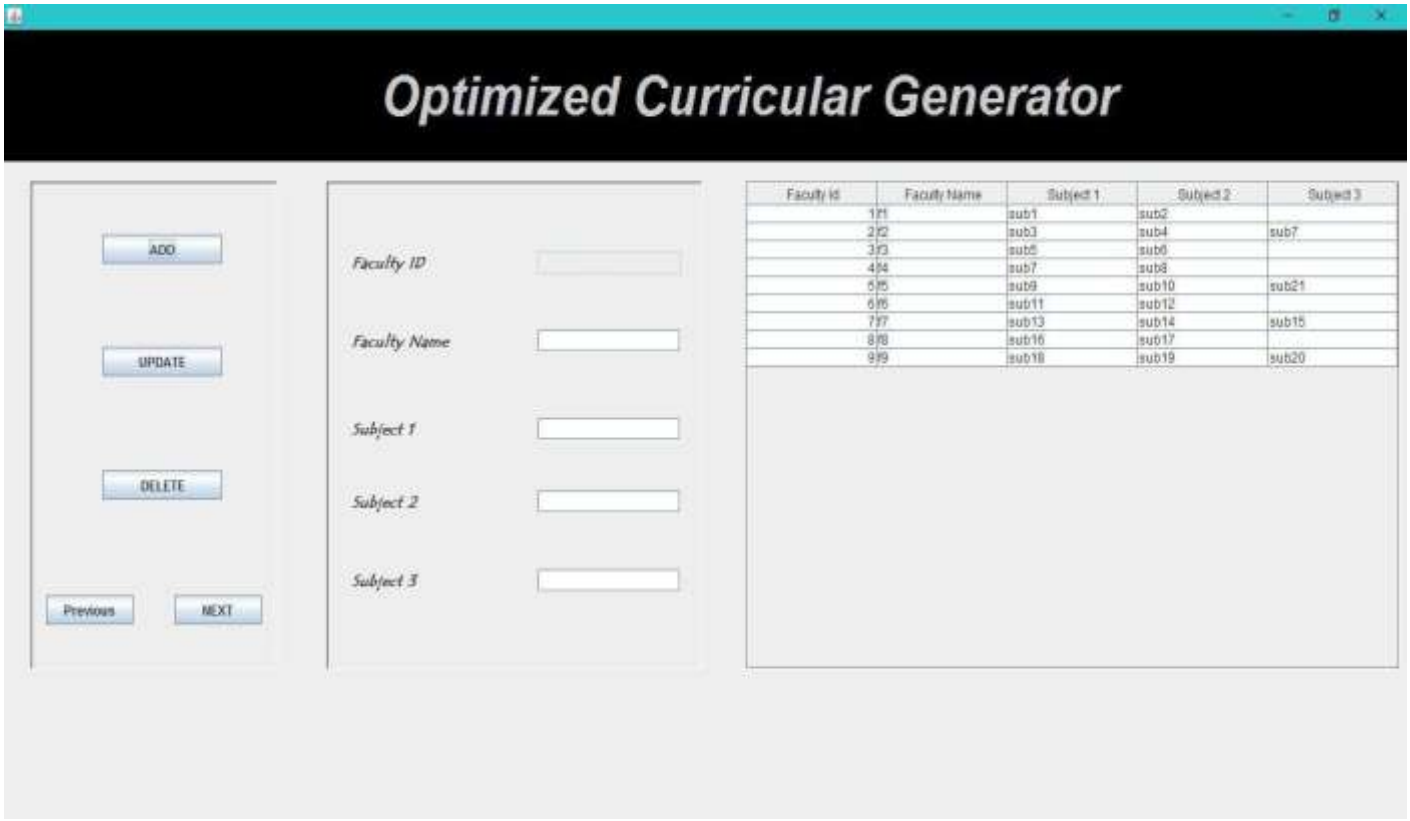
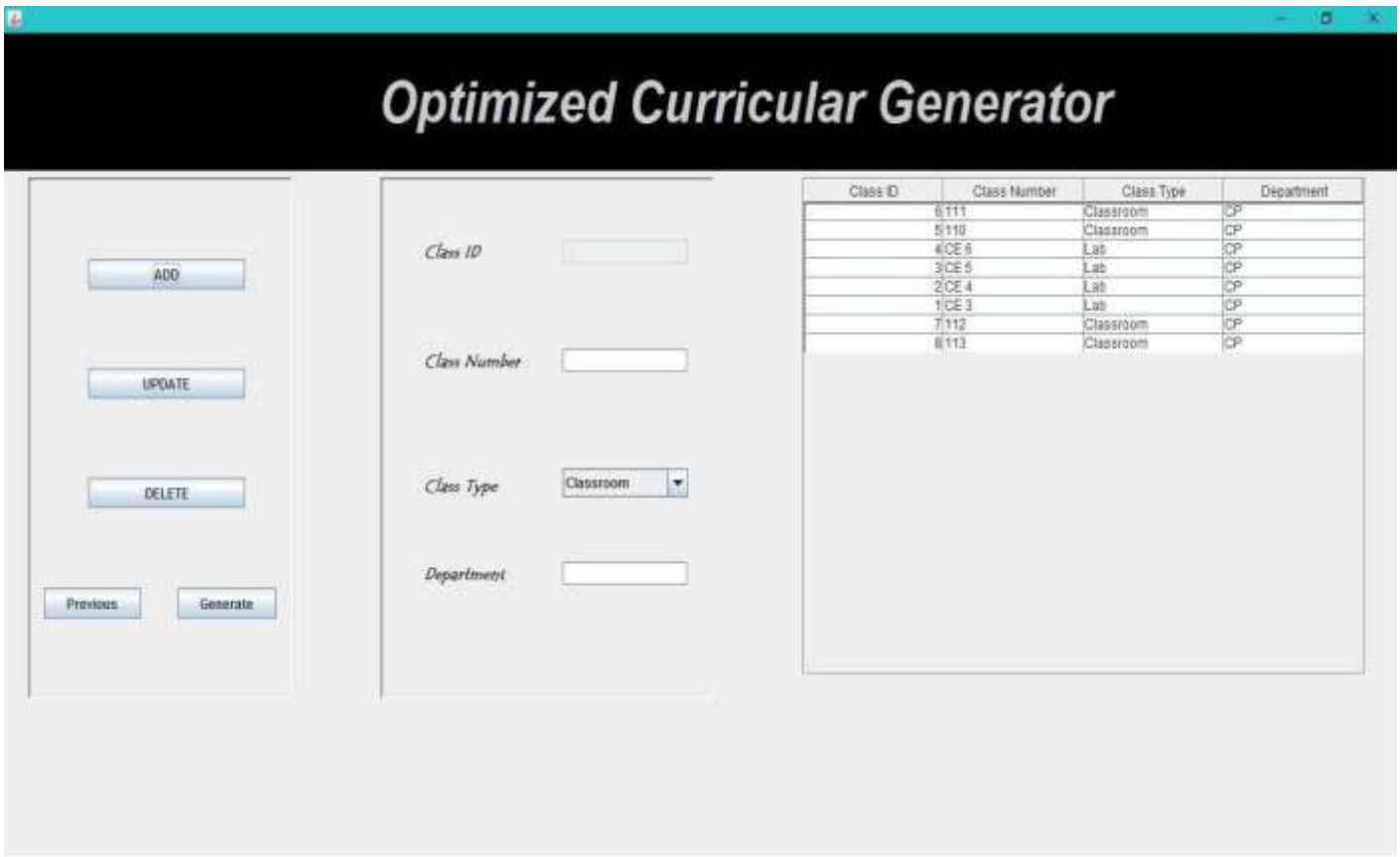
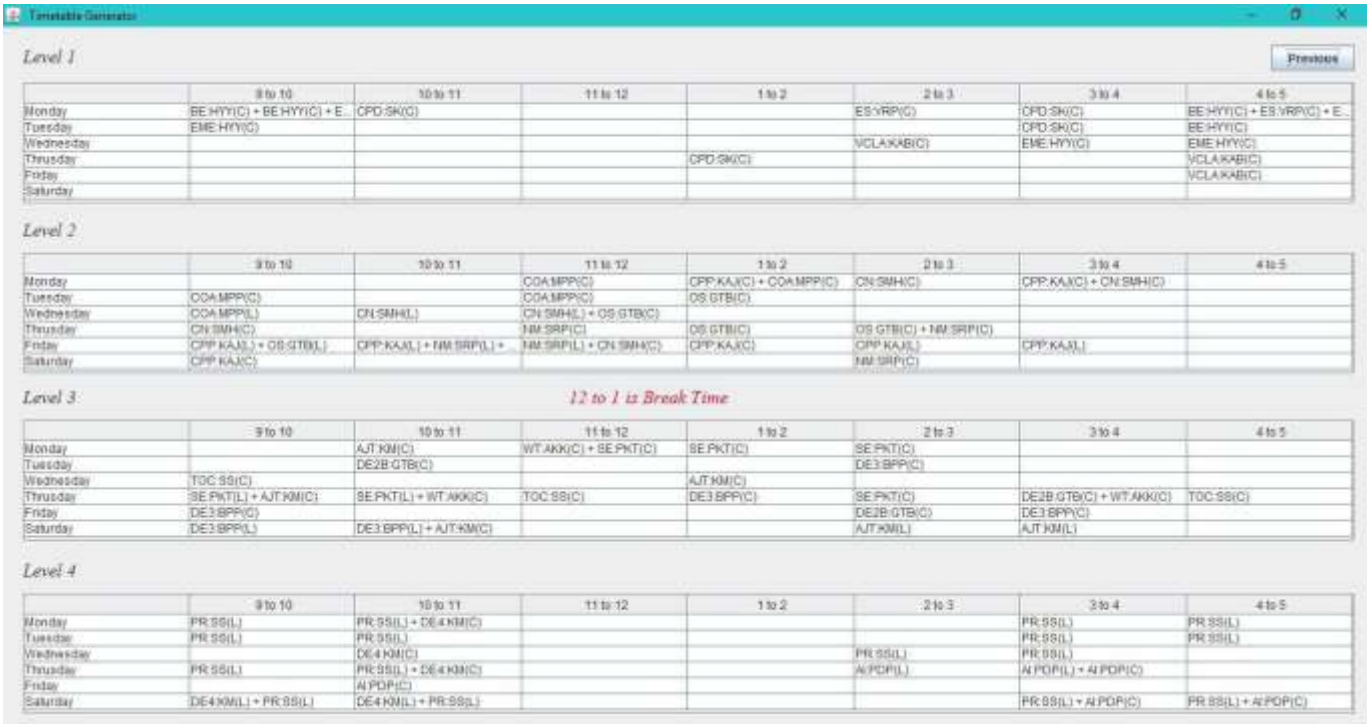
FacultyDetails:



Class/Lab:



Output



Level 1

Previous

	9 to 10	10 to 11	11 to 12	1 to 2	2 to 3	3 to 4	4 to 5
Monday	BE:HYY(C) + BE:HYY(C) + E...	CPD:SK(C)			ES:VRP(C)	CPD:SK(C)	BE:HYY(C) + ES:VRP(C) + E...
Tuesday	EME:HYY(C)					CPD:SK(C)	BE:HYY(C)
Wednesday					VCLA:KAB(C)	EME:HYY(C)	EME:HYY(C)
Thursday				CPD:SK(C)			VCLA:KAB(C)
Friday							VCLA:KAB(C)
Saturday							

Level 2

	9 to 10	10 to 11	11 to 12	1 to 2	2 to 3	3 to 4	4 to 5
Monday			COA:MPP(C)	CPP:KAJ(C) + COA:MPP(C)	CN:SMH(C)	CPP:KAJ(C) + CN:SMH(C)	
Tuesday	COA:MPP(C)		COA:MPP(C)	OS:GTB(C)			
Wednesday	COA:MPP(L)	CN:SMH(L)	CN:SMH(L) + OS:GTB(C)				
Thursday	CN:SMH(C)		NM:SRP(C)	OS:GTB(C)	OS:GTB(C) + NM:SRP(C)		
Friday	CPP:KAJ(L) + OS:GTB(L)	CPP:KAJ(L) + NM:SRP(L) +	NM:SRP(L) + CN:SMH(C)	CPP:KAJ(C)	CPP:KAJ(L)	CPP:KAJ(L)	
Saturday	CPP:KAJ(C)				NM:SRP(C)		

Level 3

12 to 1 is Break Time

	9 to 10	10 to 11	11 to 12	1 to 2	2 to 3	3 to 4	4 to 5
Monday		AJT:KM(C)	WT:AKK(C) + SE:PKT(C)	SE:PKT(C)	SE:PKT(C)		
Tuesday		DE2B:GTB(C)			DE3:BPP(C)		
Wednesday	TOC:SS(C)			AJT:KM(C)			
Thursday	SE:PKT(L) + AJT:KM(C)	SE:PKT(L) + WT:AKK(C)	TOC:SS(C)	DE3:BPP(C)	SE:PKT(C)	DE2B:GTB(C) + WT:AKK(C)	TOC:SS(C)
Friday	DE3:BPP(C)				DE2B:GTB(C)	DE3:BPP(C)	
Saturday	DE3:BPP(L)	DE3:BPP(L) + AJT:KM(C)			AJT:KM(L)	AJT:KM(L)	

Level 4

	9 to 10	10 to 11	11 to 12	1 to 2	2 to 3	3 to 4	4 to 5
Monday	PR:SS(L)	PR:SS(L) + DE4:KM(C)				PR:SS(L)	PR:SS(L)
Tuesday	PR:SS(L)	PR:SS(L)				PR:SS(L)	PR:SS(L)
Wednesday		DE4:KM(C)			PR:SS(L)	PR:SS(L)	
Thursday	PR:SS(L)	PR:SS(L) + DE4:KM(C)			AI:POP(L)	AI:POP(L) + AI:POP(C)	
Friday		AI:POP(C)					
Saturday	DE4:KM(L) + PR:SS(L)	DE4:KM(L) + PR:SS(L)				PR:SS(L) + AI:POP(C)	PR:SS(L) + AI:POP(C)

Note:In output if there are more than one subject in a single slot then it called as a clash and that is to be handled manually.

IV. CONCLUSION

Separate timetable for the individual class, faculty and labs are generated automatically by this system. Various slot combinations can be acquired so that another timetable is generated as of need. The project reduces time consumption and the manpower pain in framing the timetable manually.Additional features that can be added in the project is that faculty replacement is also made possible by listing out the available faculty who are eligible to be assigned as temporary faculty until a replacement faculty is assigned.

V. ACKNOWLEDGEMENT

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