School of Computing, SASTRA deemed University
Second CIA Test – March 2019
Course Code: BCSCCS603R03 Course Name: Compiler Engineering

KEY

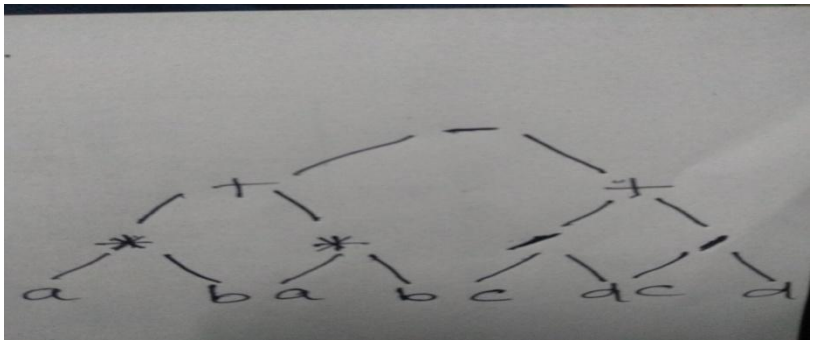
Part – A

1. If every expression can be typed at compile time, the language is *statically typed*; if some expressions can only be typed at runtime, the language is *dynamically typed*.

2. *Avoidance and Evaluation*

3. We can replace the <*symbol*, *state*> pairs with triples <*value*, *symbol*, *state*>.
This approach stores the values at easily computed locations relative to the top of the stack. Each reduction pushes its result onto the stack as part of the triple that represents the left-hand side.

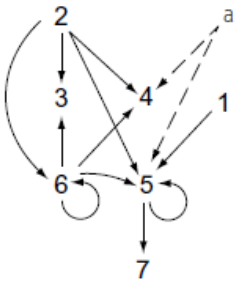
4. AST



5.

Single-statement blocks	**Basic blocks**
a block of code that corresponds to a single source-level statement	a block of code that corresponds to a multiple source-level statement
It simplifies algorithms for analysis and optimization. But consumes more time and space.	It Consumes less time and space

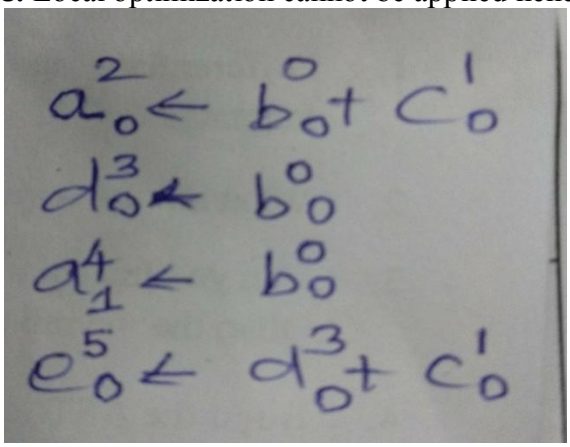
6.



7. LookUp(name) returns the record stored in the table at *h*(name) if one exists. Otherwise, it returns a value indicating that name was not found.

Insert(name,record) stores the information in record in the table at *h*(name). It may expand the table to accommodate the record for name.

8. Local optimization cannot be applied hence the life time of 'a' is changed.



9. If all the operands of an operation have known constant values, LVN can perform the operation and fold the answer directly into the code.

Example:

Before	After
int f(void)	int f(void)
{	{
return 3+5;	return 8;
}	}

10. Build a CFG
Gather initial information
Solve the equations to produce LiveOut(b) for each block b

Part – B

11. Attribution rules (4 marks)
Dependency graph for the input -111 (6 marks)

12. Three address code (5 marks)
Identifying 2 basic blocks (2 marks)
Control flow graph (3 marks)

13. Tree height balancing
Phase 1 Finding Candidate trees (4 marks)
Phase 2 Construction of balanced tree (6 marks)

14. Inline Substitution method with diagram (5 marks)
Decision procedures (5 marks)