Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SEVENTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018

Course Code: CS403

Course Name: PROGRAMMING PARADIGMS

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 4 marks. Marks

1		Show what is side-effect in an expression with the help of an example?	(4)
2		Can a user access a non-local object in case of subroutines, give valid reasons.	(4)
3		With example, briefly explain structural and named equivalence.	(4)
4		Describe the parameter modes used in ADA.	(4)
5		Consider the function (define double(lamda(x)(+xx))) , Evaluate the expression (double(*23)) in applicative order as well as normal order.	(4)
6		With help of an example, show how exception is handled in C++?	(4)
7		Differentiate greedy and minimal matches. Generate greedy and minimal matches for the pattern /(cd)+/ in the string acdcdcdcde	(4)
8		Explain constructors and destructors	(4)
9		What is a thread pool in Java? What purpose does it serve?	(4)
10		In what sense is fork/join more powerful than co-begin?	(4)

PART B

Answer any two full questions, each carries 9 marks.

11	a)	Write a pseudo code to find factorial of a number based on recursive and tail recursive procedure.		(4)

	b)	Give the code for the following source with and without short-circuit evaluation.
		if((A<=B) and (C<D) or (E!=F)) then
		then clause
		else
		else_clause
				(5)

12	a)	Summarize the differences among mark and sweep, stop and copy, and generational garbage collection.		(5)
	b)	How records are represented in programming languages? Explain.		(4)
13	a)	Consider the following pseudocode: x : integer := 3 y : integer := 4 procedure add x := x + y procedure second(P : procedure) x : integer := 5 P() procedure first y : integer := 6		(4)

```
second(add)
first()
write integer(x)
```

(a) What does this program print if the language uses static scoping? Give reasons

(b) What does it print if the language uses dynamic scoping and give reasons

b) What are the memory layouts used in arrays? How the address calculation is done in three dimensional arrays? (5)

PART C

Answer any two full questions, each carries 9 marks.

14 a) Explain co-routine? Why cactus-stack is used in co-routine? (6)

b) In what sense do generics(template) serve a broader purpose in C++? (3)

15 a) Explain how to maintain the static link and dynamic link during a subroutine call. (4)

b) (5)

```
(let ((a 6)
(b 8)
(square (lambda (x) (* x x)))
(plus +))
(sqrt (plus (square a) (square b))))
```

Write the output of the above code? Explain how let and lambda construct works

16 a) Define lazy evaluation with an example. (3)

b) How database manipulation is carried out in Prolog using assert and retract? (3)

c) What are the unification rules used in Prolog? (3)

PART D

Answer any two full questions, each carries 12 marks.

17 a) Explain the innovative features of scripting languages. (9)

b) Summarize the visibility rules used in C++. (3)

18 a) Compare and differentiate the data types of popular scripting languages to those of compiled languages like C. (6)

b) What is a semaphore? What operations does it support? How binary and general semaphore does differ? (6)

19 a) Describe six different mechanisms(principles) commonly used to create new threads of control in a concurrent program (9)

b) What is a JIT compiler? What are its potential advantages over interpretation/conventional compilation? (3)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SEVENTH SEMESTER B.TECH DEGREE EXAMINATION(S), MAY 2019

Course Code: CS403

Course Name: PROGRAMMING PARADIGMS

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 4 marks. Marks

1		What is binding time? Explain the distinction between the lifetime of a name to object binding and its visibility.	(4)
2		Does C have enumeration controlled loops? Explain.	(4)
3		What is a dope vector? What purpose does it serve?	(4)
4		What is a higher order function? Give three examples.	(4)
5		What are facts, rules and queries?	(4)
6		How does an in-line subroutine differ from a macro?	(4)
7		Explain how reader writer lock differs from a normal lock.	(4)
8		What is busy waiting? What is its principal alternative?	(4)
9		Does a constructor allocate a space for an object? Explain.	(4)
10		What is a V-table? How is it used?	(4)

PART B

Answer any two full questions, each carries 9 marks.

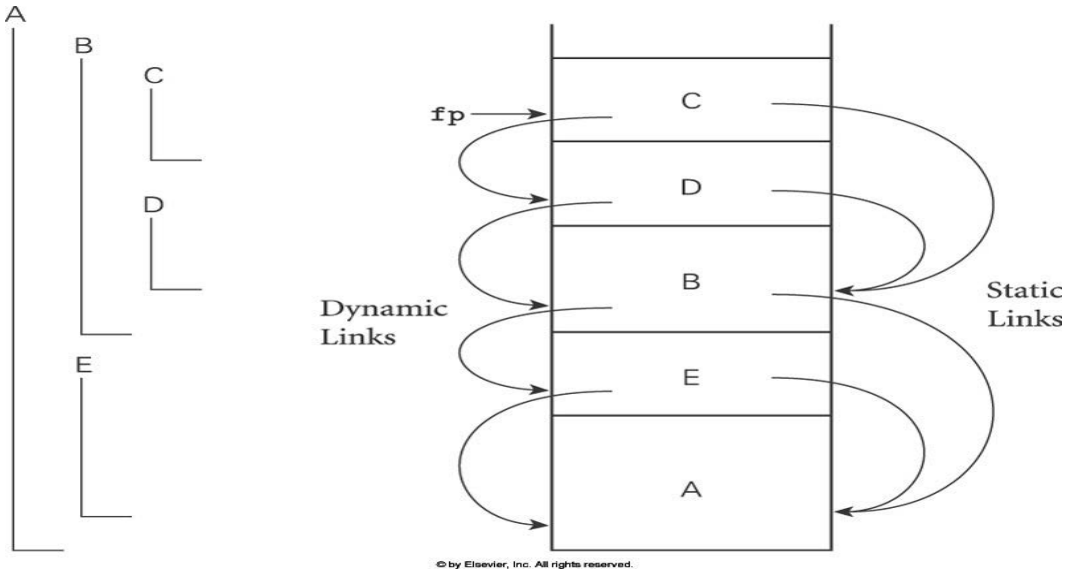
11 a) From the given fragment of code, identify the scope of each names used in code and also define closest nested scope rule. (6)

```
procedure P1(A1 : T1);
var X : real;
...
procedure P2(A2 : T2);
...
procedure P3(A3 : T3);
...
begin
... (* body of P3 *)
end;
...
begin
... (* body of P2 *)
end;
...
procedure P4(A4 : T4);
```

```
...
function F1(A5 : T5) : T6;
var X : integer;
...
begin
... (* body of F1 *)
end;
...
begin
... (* body of P4 *)
end;
...
begin
... (* body of P1 *)
end
```

b) C language is not a strongly typed language. Can you give the reason that prevents C to be strongly typed language? (3)

12 a) With help of given figure, Show how static and dynamic link works? (5)



b) What is the difference between value model of variables and a reference model of variables? Why is the distinction important? (4)

13 a) (6)

Consider the following records of a particular language. Let the size of each char variable be 1 byte, int be 4 bytes and float be 8 bytes.

1) struct student **2) union student**

```
{                                   {
        char name[2];                       char name[2];
        int age;                            int age;
        float mark;                         float mark;
}                                   }
```

Draw the memory layout for the records (1) and (2) for a 32-bit aligned machine.

b) Explain the difference among strict and loose name equivalence (3)

PART C

Answer any two full questions, each carries 9 marks.

14 a) Describe four parametric-passing modes. How does a programmer choose a parameter mode in a particular scenario (6)

b) Describe three alternative means of allocating co-routine stacks. (3)

15 a) What is a subroutine calling sequence? What does it do? What is meant by subroutine prologue and epilogue? (6)

b) How let and letrec constructs work in scheme? (3)

16 a) (6)

```
rainy(seattle).
rainy(rochester).
cold(rochester).
snowy(X) :- rainy(X), cold(X).
```

From the above facts and rules, explain the backtracking strategy in Prolog.

b) Draw a DFA to accept all strings of zeros and ones containing an even number of each. How a Scheme interpreter works in this case? (3)

PART D

Answer any two full questions, each carries 12 marks.

17 a) Generate strings and output from the following pattern (9)

i) `/a(bc)?/`

ii) `/a(bc)+/`

iii) `/a(bc){3}/`

iv) `/a(bc){2,}/`

v) `/a(bc){1,3}/`

vi) `/b[aeiou]d/`

vii) `/0x[0-9a-fA-F]+/`

viii)
```
$foo = "albatross";
$foo =~ s/[aeiou]/-/g;
```

ix)
```
$foo = "albatross";
$foo =~ s/lbat/c/;
```

b) Explain the difference between dynamic and static method binding (3)

18	a)	What are characteristics of scripting language? Explain in detail	(7)
	b)	Summarize the architecture of Java Virtual Machine	(5)
19	a)	Explain the various synchronization mechanism used in busy wait synchronization?	(6)
	b)	With a neat diagram explain the architecture of threads	(6)

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SEVENTH SEMESTER B.TECH DEGREE EXAMINATION(R&S), DECEMBER 2019

Course Code: CS403

Course Name: PROGRAMMING PARADIGMS

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 4 marks. Marks

1		What is Referencing Environment? Explain the difference between Deep and Shallow binding of Referencing Environment?	(4)
2		What are holes? Why do they arise in records? What problems do they cause? What can be done to reduce these problems?	(4)
3		What are variant records? Give a sample and its memory layout.	(4)
4		Compare co-routine and subroutine?	(4)
5		Distinguish the three access specifiers in C++.	(4)
6		Differentiate Abstract classes and Concrete classes.	(4)
7		What are the benefits of Java Virtual Machine?	(4)
8		Define Horn clause and its components.	(4)
9		Differentiate between co-routines and threads.	(4)
10		What is RPC and stub compiler?	(4)

PART B

Answer any two full questions, each carries 9 marks.

11	a)	Name the seven categories of control flow mechanisms in various programming languages. Explain each one with sample code.	(7)
	b)	Define orthogonality as a language design tool	(2)
12	a)	Compare primitive and composite data types.	(4)
	b)	Explain static and dynamic type checking with example	(5)
13	a)	What is the problem of dangling references? How is it addressed in different languages?	(5)
	b)	What is short–circuit Boolean evaluation? Why is it useful? How it is implemented?	(4)

PART C

Answer any two full questions, each carries 9 marks.

14	a)	What are the purposes of stack pointer and frame pointer registers? Explain how	(5)

these pointers are associated with subroutine linkages.

b) What is generic subroutine? Give the merits of using them in our programs? (4)

15 a) List and explain any three features of functional languages. (3)

b) Write the result of the Scheme expressions and explain how do you derived the result : (6)

i)
```
( let ( ( a  33 ) )
let ( (a 32 )
    ( b a) )
( + a  b ) ) )
```

ii)
```
( let ( ( x  24) )
( *  x
   (  let ( ( x  ( /   x  3 ) ) )
    ( +  x  x ) ) ) )
```

16 a) Explain the difference between facts, rules and queries. Give example for each one. (6)

b) What is in-line subroutine? How does it differ from macro? (3)

PART D

Answer any two full questions, each carries 12 marks.

17 a) What is shared memory? What are the two types of synchronization issues they face? Explain how these issues can be solved? (6)

b) Explain the three principal issues in using message passing. (6)

18 a) List and explain the object oriented programming concepts. (6)

b) What is shared inheritance? What is ambiguity problem in this and how the problem can be removed? (6)

19 a) What are constructors and destructors? Discuss the different forms of constructors included in C++. (6)

b) Explain the Busy-wait synchronization mechanism. (6)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech S5 (S) (PT) Exam Sept 2020

Course Code: CS403

Course Name: PROGRAMMING PARADIGMS

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 4 marks. Marks

1		What is short circuit evaluation? Give an example.	(4)
2		Differentiate between enumeration and subrange datatypes.	(4)
3		Differentiate between strongly typed and statically typed language.	(4)
4		What is a subroutine calling sequence?	(4)
5		What is the principle purpose of generics?	(4)
6		Write a code in Scheme to find factorial of a number using recursion.	(4)
7		How we can implement multiple inheritance in java?	(4)
8		Compare greedy matching with minimal matching.	(4)
9		What is a thread pool in java? What is its use?	(4)
10		What is busy waiting? What is its principal alternative?	(4)

PART B

Answer any two full questions, each carries 9 marks.

11	a)	Define closest nested scope rule. Explain with the he1p of an example.	(6)
	b)	Write a tail recursive function to print the Fibonacci series.	(3)
12	a)	How type coercion can be performed in C language? Illustrate with an example.	(4)
	b)	Differentiate between structural equivalence and name equivalence with examples.	(5)
13	a)	What is the order of evaluation in C programming language?	(4)
	b)	How array elements are stored in memory? Explain the memory address calculation.	(5)

PART C

Answer any two full questions, each carries 9 marks.

14	a)	Show the functioning of co-routines with appropriate diagram.	(3)
	b)	Explain the different types of parameter passing methods.	(6)
15	a)	Define Lambda calculus.	(3)
	b)	Demonstrate Lazy Evaluation with an example, How it benefits?	(6)
16	a)	What is a static chain? How is it maintained during a subroutine call?	(6)
	b)	How equality testing can be done in Scheme?	(3)

PART D

Answer any two full questions, each carries 12 marks.

17	a)	Write a C++ program to add two complex numbers of the form a+ib using operator overloading and explain the overloading.	(8)
	b)	How to implement overloading in C++?	(4)
18	a)	What do you mean by late binding of machine code? What are its advantages and disadvantages?	(6)
	b)	Write short notes on Virtual Machines.	(3)
	c)	What is quasi parallelism?	(3)
19	a)	Explain busy wait synchronization.	(6)
	b)	What are the different features of scripting languages?	(6)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Seventh Semester B.Tech Degree Examination (Regular and Supplementary), December 2020

Course Code: CS403
Course Name: PROGRAMMING PARADIGMS

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 4 marks. Marks

1	What do you mean by compaction?	(4)
2	Explain orthogonality as language design tool.	(4)
3	What are the importances of data types in programming languages?	(4)
4	What are the characteristics of subroutines?	(4)

5	Begin
	Integer n;
	procedure P (K: integer)
	n := n+1;
	k := k+4;
	print (n);
	end
	n :=0;
	P(n);
	print (n);
	end
	What will be the output for the following parameter passing methods?
	a) call by value/result
	b) call by reference
	c) call by value
		(4)

6	What is Eval and apply?	(4)
7	Explain different types of inheritance with example.	(4)
8	Differentiate function overloading and function overriding.	(4)
9	Write a note on Remote Procedure call.	(4)
10	Explain co-schedule and its purpose.	(4)

PART B

Answer any two full questions, each carries 9 marks.

11 a) Explain heap based storage allocation techniques. (6)

b) Consider 1-Mbyte of memory is allocated using Buddy System. Show the allocation and deallocation of the following : (3)

1. Request 100k(A)
2. Request 240k(B)
3. Request 64k(C)
4. Request 256k(D)
5. Release B
6. Release A
7. Request 75k
8. Release C
9. Release E
10. Release D

12 a) Explain various categories of type compatibility. (5)

b) Explain memory layout and its impact on record data types. (4)

13 a) What is the importance of garbage collector? What are the various techniques used in garbage collection? (5)

b) How does the scope rule of passed function is evaluated? (4)

PART C

Answer any two full questions, each carries 9 marks.

14 a) Explain generic subroutine. Explain how generic programs are implemented in C++ and JAVA. (6)

b) What is the difference between coroutine and thread? (3)

15 a) Explain the working of scheme interpreter in the DFA simulation with an example. (5)

b) Write short notes on Higher order functions. (4)

16 a) What is an exception? How is it handled? Write an example in any one language. (6)

b) Explain equality testing in scheme with example. (3)

PART D

Answer any two full questions, each carries 12 marks.

17 a) Explain dynamic method binding in object-oriented programming. (6)

b) Explain data types supported by scripting languages. (6)

18 a) Explain features and architecture of java virtual machines. (9)

b) Explain the term barrier and monitor. (3)

19 a) Explain pattern matching mechanism in scripting languages. (6)

b) Explain Reflection in detail. (6)