**Section 1: Exceptions**

**2) 5 Examples of Exceptions:**

1. User enters invalid data
2. A file that needs to be opened or is being accessed by the program cannot be found
3. Network connection is lost
4. There isn’t enough memory to proceed
5. Program performs an action that may cause an overflow or can go out of bounds

**4) Give an Example of:**

1. A Synchronous Exception: An error is detected in the program and it is terminated by the operation system.
2. An Asynchronous Exception: Direct responses made by the program.

**9) What happens to the exception thrown in the following code?**

void funcA(){

throw(new Exception e);

}

void funcB()

{ funcA();

}

int main()

{ funcB();

}

Exception will be thrown back to whoever called to see if that function has a catch. B does not have a catch, so it will be thrown to main(). Main also does not have a catch either so it will go to the default handler and crash the program.

**a. Update main() to catch the exception for funcA.**

try

{

funcB();

}

catch(Exception& e)

{

Cout <<e.what() << endl;

}

**Section 2: Pascal**

**1.) Write a sample of Pascal code where you declare one global variable and one local variable.**

program huntTheWumpus;

var

winner : string;

procedure fillBoard;

var

row: integer;

begin

….

end

begin

….

end

**2.) Is Pascal a block-structured language?**

Pascal is a block type programming language

**3.) In what way does Pascal encourage the use of global variables?**

program name;

const

{any program constants}

type

{any type declarations}

var

{any global variables}

{any procedure and function definitions}

begin

{program body}

end .

When a program is created, no variables can be declared in the main begin block of the program. All variables must be declared in the var section. This is bad because you may want to create functions or procedures inside the program still and those functions and procedures are able to access the global variables created before.

**Section 3: Control - Function and Procedures**

**4. Why doesn’t this C++ code work and how can it be fixed?**

void odd(int x){

if (x<=0) cout << “Odd”;

else even(x-1);

}

void even(int x){

if (x <= 0) cout << “Even”;

else odd(x-1);

}

You have to first prototype the functions because the functions don’t know each other exists yet.

void odd(int x);

void even (int x);

Add these to the beginning of the file

**5.) What causes a stack overflow error in a program? Is the error normally caught at runtime or compile time?**

A stack overflow occurs if the [call stack](https://en.wikipedia.org/wiki/Call_stack) pointer exceeds the stack bound. When a program attempts to use more space than is available on the call stack, the stack is said to overflow, typically resulting in a program crash. It will be caught at runtime. The program will compile but when it tries to run it will crash.

**Section 4: Object-Oriented Programming and Java**

2. What is the purpose of an application framework? What is an example from Java of an application framework?

* An application framework is a collection of related software resources for developer use. The purpose of an application framework is to save programmers time by allowing them to reuse pre existing code. An example from Java is the Swing windowing toolkit which allows GUIs to be created, modified, and reused easily.

3. What is data hiding and why is it a goal of OOLs?

* Data hiding is used to restrict access to internal details of software components. Encapsulation is an example of data hiding. Data hiding is a goal of OOLs because by using data hiding/encapsulation the user of a class does not need to know how a class stores its data.

4. What is the JVM?

* The JVM(Java Virtual Machine) is an abstract computing machine that runs java bytecode. The JVM allows Java to be a portable language that can run on any system that supports the JVM.

6. How does the memory allocation of scalar types differ from that of arrays and objects in Java?

* Scalar types are ints, doubles, chars, and bools. Every other type is know as a reference type. This means that all other types are references to their corresponding objects. If you make a copy of a reference type you make a copy of the reference itself. If you make a copy of int a = 7, for example, then the copy would just be a new variable with value 7.

7. Are arrays statically or dynamically allocated in Java?

* In Java arrays are dynamically allocated.

8. Define the following: Constructors, Accessors, and Mutators.

* Constructors are used to create an instance of a class
* Accessors are used to return the value of a private field
* A Mutator is used to set the value of a private field

9. Your project includes the two classes – A and B – from the question 5. It also has the following main function:

public class Main {

public static void main(String[] args) {

A obj = new A(2);

obj.do();

obj = new B(4);

obj.do();

B obj2 = new B(6);

obj2.do();

}

}

1. Show what the code would display normally.

* First will output 2, second will output 16 run B’s version of the do function, and third set will output 36

B. What would be displayed if Java were modified to remove polymorphism?

* If we removed polymorphism it would use A’s do function for the second output so it would look like 2, 4, 36.

13. What is wrong with the following Java code excerpt and how could it be fixed?

String s = new String(“Hello World”);

String t = new String(“Hello World”);

if (s == t)

System.out.println(“The same!!”);

else

System.out.println(“Not the same!!”);

* The (s==t) statement is comparing memory locations and not string values. In order to fix the error the programmer could use s.toString() == t.toString().

21. Give 5 examples of events.

* Button Clicked
* Minimized
* Text Entered
* Timer
* Packet Arrives

23. How does the object-oriented nature of languages like Java make it easier to write GUI programs?

* Object Oriented languages make it easier to write GUI programs because they allow programmers to use application frameworks such as Swing for Java and Microsoft Foundation Classes for C++ GUI development.