Theory Subjects – 20 January 2020

Work Time: 40min

Please copy the subjects and then close your laptops.

1 (1p). Compare checked vs. unchecked exceptions in Java.

2 (3p). Given the following collection

List<Integer> numbers = Arrays.asList(1, 2, 3, 4, 5, 6, 7, 8,9,10,11,12,14,15);

Using Java functional style (Java streams),

please write a program that is doing the following operations in the following order:

a)keep only the numbers which are multiple of 3 or multiple of 2;

b)transform each remaining number into a string, that consists of a prefix "A", the successor of the number and the suffix "B"

(eg. 6 is transformed into "A7B")

c)concatenate all the strings

3 (3p). Given the following four classes in Java:

class A {...} class B extends A {...}

(eg. 6 is transformed into "A7B")

c)concatenate all the strings

3 (3p). Given the following four classes in Java:

```
class A {...}   class B extends A {...}
class C extends A {...}


class Amain{


...  method1(... list) {  return list.get(1);}


void method2(...  list,  A el) {
list.add(el);}


void method3(A elem){

ArrayList<A> listA=new ArrayList<A>();
listA.add(new A());listA.add(new A());

ArrayList<B> listB = new ArrayList<B>();
listB.add(new B());listB.add(new B());

ArrayList<C> listC = new ArrayList<C>();
listC.add(new C());listC.add(new C());

this.method1(listA); this.method1(listB);
this.method1(listC);

this.method2(listA,elem);
this.method2(listB,elem);
this.method2(listC,elem);

}

}
```

```
void method2(...  list,  A el) {
list.add(el);}



void method3(A elem){

ArrayList<A> listA=new ArrayList<A>();
listA.add(new A());listA.add(new A());

ArrayList<B> listB = new ArrayList<B>();
listB.add(new B());listB.add(new B());

ArrayList<C> listC = new ArrayList<C>();
listC.add(new C());listC.add(new C());

this.method1(listA); this.method1(listB);
this.method1(listC);

this.method2(listA,elem);
this.method2(listB,elem);
this.method2(listC,elem);

}

}
```

Compute the most specific signatures for the class Amain methods (method1 and method2)

such that the entire program is correct. If it is not possible to find the types justify your answer.

Discuss line by line the correctness of the above program.

3 (2p). What is a Cyclic Barrier in Java.