zx306 Ziyue Xu OOP Supo 1

Question 2:

https://chime.cl.cam.ac.uk/page/repos/zx306/fibonacci/summary

1. The provided test only test the case when parameter i = -1 and i = 0. However, the other base cases where i = 1 / 2 and the general case where i > 2 are not tested. Thus we cannot ensure that the program runs correctly with those inputs. So we need more tests.
2. For small values of i, the difference of time taken between 2 functions can be negligible. Thus it’s hard to determine whether FibonacciTable makes use of cache or not.

Question 5

public class TailRecursion {

public static int factorial(int i) {

return factorialHelper(i, 1);

}

public static int factorialHelper(int i, int result) {

if (i <= 1) {

return result;

} else {

return factorialHelper(i - 1, i \* result);

}

}

public static void main(String[] args) {

System.out.println(factorial(5));

}

}

Question7

Variables of primitive type: d, f

Variables of references type: i[]. t, c

Classes: LinkedList<Double>

Objects: l, k

Question 8

https://chime.cl.cam.ac.uk/page/repos/zx306/classic\_collections\_lists\_and\_queues/summary

1. The empty list is represented with the head points to null.
2. The toString() method in class LinkList will check if the head is null or not. If it’s null, then it just returns “”. Otherwise, it will call the toString() method for each node. If next of the node is not null, it will concatenate value with “,”, and then concatenate next, which recursively calls toString() to get the value until next is null, where the recursion stops.
3. The static factory method can create an instance in different ways according to different inputs thus it’s easier to use and implement if there are several cases when creating an object.

|  |
| --- |
| LinkList |
| - head : Node |
| + create(int[] elements) : LinkList  - addFirst(int element): void  + toString(): String |

|  |
| --- |
| Node |
| - value: int  - next: Node |
| + toString(): String |

Questions 10

Test() should be a constructor thus it should have no return value. However Test() is defined with return type void so it’s not a constructor. It’s just a function and will not effect the value of variable outside the function.

Question 14

1. D
2. K
3. D
4. The values of variables cannot be changed or assessed by the user.

Question 15

Question 20

