This quiz has been re-graded; your score was not affected.

Final Quiz

Due 8 Nov at 12:00 **Points** 30 **Questions** 30 **Available** 8 Nov at 10:30 - 8 Nov at 12:00 about 2 hours **Time limit** 90 Minutes

Instructions

Final Quiz - Week 13

There are **30 questions** in this quiz. It will last for 90 mins.

Please, note the following criteria:

1. ID or Uni ID should be on the table at all time;
2. Paper for drafting will be provided;
3. No electronics, browsing or compiler allowed (it is a closed book quiz). No opening bags either.
4. Absence from the room to toilet, you must leave all your belongings on the desk;

This quiz is no longer available as the course has been concluded.

Attempt history

	Attempt	Time	Score	Re-graded
LATEST	Attempt 1	49 minutes	30 out of 30	30 out of 30

Score for this quiz: **30** out of 30
Submitted 8 Nov at 11:20
This attempt took 49 minutes.

Question 1

1 / 1 pts

The following Java declarations have been made:

```
int x = 20;
int y = 30;
boolean c = false;
```

What is the value of the following boolean expression

```
(x < y) && (y == 30) || c && (y-x <= 10)
```

False

Correct!

[✓ True]

Question 2

1 / 1 pts

Consider the following code fragment.

```
int a = 10;
int b = 20;
int ans = 0;
if (a <= 10) {
    ans = 10;
    if (a < 20) {
        ans = 30;
    } else {
        ans = b;
    }
} else {
    ans = a;
    if (b >= 20) {
        ans++;
    }
}
```

What's the value of *ans* after running this code?

Correct!

[✓ 30]

20

10

11

Question 3

1 / 1 pts

Consider the following code, what will be the value of *ans* after running this code?

```
int x = 0;
int y = 2;
int ans = 0;
while ( x < 10 ) {
    ans = ans + y;
    x++;
}
```

- ○ 0
- Correct! [✓ 20]
- ○ 18
- ○ 22

Question 4

1 / 1 pts

You are working inside a directory that is under SVN control.

You type the following command to check the status of your work:

```
svn status
```

You receive the following output on the screen:

```
M myfile01.java
A myfile02.java
? myfile03.java
```

In the following options, which is true?

- ○ myfile03.java cannot be compiled
- ○ myfile02.java is added and myfile01.java is moved to another folder
- Correct! [✓ myfile02.java is added and myfile01.java is modified]
- ○ myfile03.java cannot be found

Question 5

1 / 1 pts

```
public static void divideByTwo(int myNumbers[], int size)
{
    for (int x=0; x<size; x++){
        myNumbers[x] = myNumbers[x]/2;
    }
}

public static void main(String[] args) {
    int numbers[] = {1,2,3,4,5,6,7,8,9,10};
    divideByTwo(numbers, 10);
    System.out.println("The fifth number is ");
    System.out.println(numbers[4]);
}
```

What **number** will be printed after running the above script?

Correct!

- [✓ 2]
- 0
- 3
- 2.5

Question 6

1 / 1 pts

Consider the initialization of 2D arrays. In this task, you are required to initialize an array containing 4 rows and 5 columns. What is the correct way of initializing this array, among the options:

- `int[4][5] array = new int[][];`

Correct!

- [✓ `int[][] array = new int[4][5];`]
- `int[][] array = new int[3][4];`

```
int[4][5] array = new int[4][5];
```

Question 7

1 / 1 pts

What's the value of *array* after running the following code?

```
int[][] array = {{0,0,0,0},
                 {0,0,0,0},
                 {0,0,0,0}};
for (int i=0; i<3; i++) {
    for (int j=0; j<4; j++) {
        array[i][j] = i*10 + j;
        if (j == 2) {
            break;
        }
    }
}
```

Correct!

[✓
```
{{0,  1,  2,  0},
 {10, 11, 12, 0},
 {20, 21, 22, 0}}
```
]

```
{{0, 1, 2, 0},
 {0, 0, 0, 0},
 {0, 0, 0, 0}}
```

```
{{0,  1,  0, 0},
 {10, 11, 0, 0},
 {20, 21, 0, 0}}
```

```
{{0,  1,  2,  3},
 {10, 11, 12, 13},
 {20, 21, 22, 0}}
```

Question 8

1 / 1 pts

In our program, we define the Student class as

```
class Student {
    // other code ...

    public Student () {
        this.name = "unknown";
        this.degree = "unknown";
        this.grade = 0;
    }

    public Student (String name, String degree) {
        this.name = name;
        this.degree = degree;
        this.grade = 0;
    }

    public Student (String name, double grade) {
        this.name = name;
        this.degree = "unknown";
        this.grade = grade;
    }

    public printInfo() {
        System.out.println("Student's name: " + this.name +
                           ", Student's degree: " + this.degree +
                           ", Student's grade: " + this.grade);
    }

    // other code ...
}
```

What is the output if we run the following scripts

```
Student Mike = new Student("Mike", 95);
Student Jeff = new Student("Jeff", "CS");
Mike.printInfo();
Jeff.printInfo();
```

-
  ```
  Student's name: Mike, Student's degree: CS, Student's grade: 0
  Student's name: Jeff, Student's degree: unknown, Student's grade: 95
  ```

-
  ```
  Student's name: Mike, Student's degree: CS, Student's grade: 95
  Student's name: Jeff, Student's degree: CS, Student's grade: 95
  ```

Correct!

[✓]
```
Student's name: Mike, Student's degree: unknown, Student's grade: 95
Student's name: Jeff, Student's degree: CS, Student's grade: 0
```

```
Student's name: unknown, Student's degree: unknown, Student's grade: 0
Student's name: unknown, Student's degree: unknown, Student's grade: 0
```

Question 9

1 / 1 pts

In programming, the overloading of a methot/function is the ability to create multiple methods using the same naming. Therefore, we can have different implementations.

Consider the case of overloading methods, one of the following options is considered invalid. Which one is INVALID?

```
double add(int a, double b);
int add(int a, int b, int c);
```

```
double add(int a, double b);
double add(int a, float b);
```

```
int add(int a, double b);
int add(double b, float c);
```

Correct!

[✓]
```
double add(int b, double a);
int add(int a, double b);
```

Question 10

1 / 1 pts

Assume we have defined the following classes:

```
class Sort{
    void getClassName() {
        System.out.println("Sort");
    }
}
```

```
class MergeSort extends Sort{
    void getClassName() {
        System.out.println("Merge Sort");
    }
}
```

```
class QuickSort extends Sort{
    void getClassName() {
        System.out.println("Quick Sort");
    }
}
```

What's the output when we run the following code?

```
// other codes...
Sort s0 = new Sort();
Sort s1 = new MergeSort();
Sort s2 = new QuickSort();
s0.getClassName();
s1.getClassName();
s2.getClassName();
// other codes...
```

○
```
Sort
Quick Sort
Merge Sort
```

○
```
Sort
Quick Sort
Quick Sort
```

Correct!

[✓]
```
Sort
Merge Sort
Quick Sort
```

```
Sort
Sort
Sort
```

Question 11

1 / 1 pts

Access level modifiers determine whether other classes can work with an attribute or invoke a particular method. In this task, you are asked to match a list of access level modifiers with their descriptions.

Correct!	**public**	This modifier specifies that th
Correct!	**protected**	This modifier specifies that th
Correct!	**privated**	This modifier specifies that th

Question 12

1 / 1 pts

The Linux command interpreter or shell is the program users interact with in a terminal emulation window. In this task, you are asked to match a list of shell command with their descriptions.

Correct!	**pwd**	To know which path/directory
Correct!	**ls**	To know what files are in the c
Correct!	**cd**	To go to some directory

Correct!

mv To move files and directories ▾

Correct!

cd .. To go to the parent directory ▾

Other Incorrect Match Options:

- To delete files and directories

Question 13

1 / 1 pts

We want to build an *Animal* class to save the animal's data. Consider the data type for each field, which of the following is the best blueprint for *Animal* class?

```
Class Animal {
    String name;
    int weight;
    String sound;
    int isHungry;
    int isSleeping;
    Food[] favouriteFoods;
}
```

```
Class Animal {
    String name;
    int weight;
    String sound;
    boolean isHungry;
    boolean isSleeping;
    Food favouriteFoods;
}
```

```
Class Animal {
    String name;
    float weight;
    String sound;
    boolean isHungry;
    boolean isSleeping;
    Food favouriteFoods;
}
```

Correct!

[✓
```
Class Animal {
    String name;
    float weight;
    String sound;
    boolean isHungry;
    boolean isSleeping;
    Food[] favouriteFoods;
}
```
]

Well done!

Among all the options, String best represent name and sound. Boolean represent well the state isHungry and isSleeping, Float represents well weight and the datatype Food as an array represents well favouriteFoods.

Question 14

1 / 1 pts

Big O notation is used in Computer Science to describe the performance or complexity of an algorithm. Consider that you have two algorithms with different Big O notation. The first runs in an *$O(n^2)$* time complexity, the second runs in an *O(n*log(n))*.

In this task, you are asked to analyze which algorithm need **MORE** steps to run into the problem when *n>100000* (asymptotically large).

- Depend on the computer running on
- [✓ $O(n^2)$] Correct!
- Both require the same amount of time
- O(n*log(n))

Question 15

1 / 1 pts

Define the calculate method as the following

```
public static int calculate(int num) {
    if(num == 0){
        return 1;
    }
    if(num == 1){
        return 2;
    }
    return calculate(num-1) - calculate(num-2);
}
```

What's the return value when you call

```
calculate(4);
```

- 0
- -1
- Correct! [✓ -2]
- 2

Question 16

1 / 1 pts

In Merge Sort, the unsorted array is recursively divided into subarrays until the subarray size is:

- 0
- Correct! [✓ 1]
- 2

Question 17

1 / 1 pts

The following array is almost sorted in an ascending order except for the last two elements.

2	3	5	7	11	4	8

In this task, you are asked to select the sorting algorithm that would have the best time performance to sort this array in **ascending** order.

- Selection Sort
- Merge Sort
- Correct! [✓ Insertion Sort]
- Quick Sort

Question 18

1 / 1 pts

The double bars (||) represent a sort marker that divides the input list into two parts: the sublist of items already sorted, which is built up from left to right at the front (left) of the list, and the sublist of items remaining to be sorted that occupy the rest of the list.

For example, in the list [1 2 || 10 5 7], the left part is sorted and the right part is unsorted.

To sort the whole list, the **SELECTION SORT** algorithm proceeds by finding smallest (or largest) number and swapping to increase the size of sorted number by 1 in each iteration. How many comparisons and swaps are needed to use **SELECTION SORT** to sort the next number. [1 || 3 4 5 8 9 10 2]

- Correct! [✓ 6 comparisions, 1 swaps]
- 7 comparisions, 6 swaps
- 6 comparisions, 6 swaps
- 6 comparisions, 7 swaps

Question 19

1 / 1 pts

In computer science, divide and conquer is an algorithm design paradigm based on multi-branched recursion. A divide and conquer algorithm works by recursively breaking down a problem into two or more sub-problems of the same or related type until these become simple enough to be solved directly.

Which of the following options is NOT divide and conquer algorithms?

Correct!

- [✓ Selection Sort]
- Merge Sort
- Binary Search
- Quick Sort

Question 20

1 / 1 pts

Binary Search is a quick search strategy. Instead of searching the list in sequence, a binary search will start by **comparing** the middle item.If that item is the one we are searching for, we are done. If it is not the correct item, we can use the ordered nature of the list to eliminate half of the remaining items. We can repeat this process until we find the correct item or the size of remaining items is 0.

If we have a sorted collection of **100** items, how many 'comparison' are required to locate an item in the collection?

- 50, you need to search half of the collection

Correct!

- [✓ About 7]
- Up to 100, it depends on where the item in the collection
- About 10

Question 21

1 / 1 pts

The _____ is a container of objects that are inserted and removed according to **first in last out**.

The _____ is a container of objects that are inserted and removed according to **first in first out**.

Correct!

- [✓ Stack, Queue]
- Singly linked list, Doubly linked list

- ○ Queue, Stack
- ○ Doubly linked list, Singly linked list

Question 22

1 / 1 pts

You have a singly linked list of integers which stored in increasing order.

Your program needs to search for a number in this list. The time complexity of this search is?

- ○ O(n^2)
- Correct! [✓ O(n)]
- ○ O(1)
- ○ O(nlogn)

Question 23

1 / 1 pts

You are using a singly linked list. What happens if you accidentally point the "next" of the second node to the head node?

- Correct! [✓ There will be a loop in the singly list and you will lose all nodes after the second node]
- ○ Second node will be the head node for the list
- ○ You can find all nodes by traversing from the head node again
- ○ The contents of the whole list will be lost

Question 24

1 / 1 pts

You are using a **singly linked** list. What happens if you accidentally set the head to null?

Correct!

- [● The contents of the list will be lost.]
- ○ The second element will now be the head.
- ○ You will be able to find all of the elements.

Question 25

1 / 1 pts

Which of the following is CORRECT

```
public void printList(){
    if (head == null) {
        return;
    }
    Node tmp = head;
    while(tmp.next() != null) {
        tmp.printNode();
        tmp = tmp.next();
    }
}
```

Correct!

- [● It will print all the nodes in the list except for the last node]
- ○ There will be a null pointer error
- ○ It will print all the nodes in the list
- ○ It will print all the nodes in the list except for the last two nodes

Question 26

1 / 1 pts

Binary search trees keep their keys in sorted order, so that lookup and other operations can use the principle of binary search: when looking for a key in a tree (or a place to insert a new key), they traverse the tree from root to leaf, making comparisons to keys stored in the nodes of the tree and deciding, on the basis of the comparison, to continue searching in the left or right subtrees.

The **worst** time complexity for searching a key stored in a binary search tree is

- O(n^2)
- O(nlogn)
- O(logn)
- Correct! [✓ O(n)]

Question 27

1 / 1 pts

Given the following binary tree, what does the tree looks like after we insert 11 into this tree?

```
      8
    /   \
   5     12
 /   \  /
1    7 10
```

-
```
      8
    /    \
   5      12
  / \     /
 1   7   10
        /
       11
```

- Correct! [✓
```
      8
    /   \
   5     12
 /   \  /
1    7 10
         \
          11
```
]

```
       8
     /   \
    5      11
  /   \  /   \
 1     7 10    12
```

```
       8
     /   \
    5      12
  /   \  /   \
 1     7 11    10
```

Question 28

1 / 1 pts

Which of the following is NOT TRUE

- Tree's have no loop
- Depth first search can be applied on both trees and graphs
- Correct! [✓ Breadth first search cannot be applied on a tree]
- Tree's have a single root

Question 29

Original score: 1 / 1 pts Re-graded score: 1 / 1 pts

! This question has been re-graded.

Given a graph saved in as an adjacency matrix.

The matrix is shown below, the first column is the source node and the first row is the target node. An element of 1 means there is a directed link from the source node to the target node and 0 means there is no direct link from the source node to the target node.

	Node 1	Node 2	Node 3	Node 4
Node 1	0	1	1	0

Node 2	0	0	0	1
Node 3	0	0	0	1
Node 4	1	0	0	0

It may help to draw the graph.

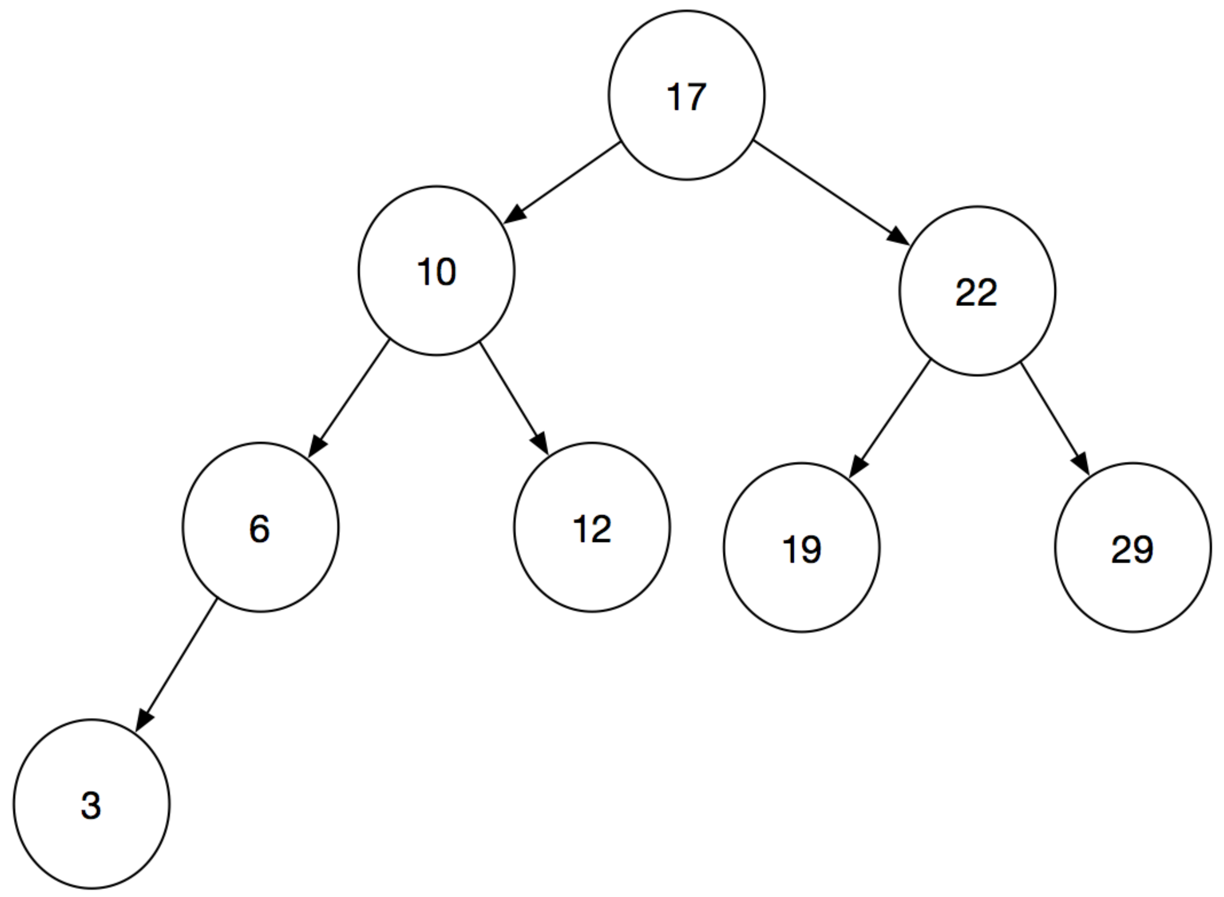
Which of the following is TRUE?

- There is a direct path from node 3 to node 2
- Correct! [✓ There are two loops in this graph]
- There is no loop in this graph
- There is only one loop in this graph

Question 30

1 / 1 pts

The order of visiting the nodes by **breadth first search (BFS)** of the following tree is



- 17, 10, 6, 12, 3, 22, 19, 29

Correct!

- [✓ 17, 10, 22, 6, 12, 19, 29, 3]
- 17, 10, 6, 3, 12, 22, 19, 29
- We cannot apply BFS on a tree

Quiz score: **30** out of 30