Assignments Quiz Review Test Submission: Midterm Exam2

Review Test Submission: Midterm Exam2

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Test	Midterm Exam2
Started	3/26/20 1:33 PM
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Status	Completed
Attempt Score	81 out of 100 points
Time Elapsed	1 hour, 20 minutes out of 1 hour and 20 minutes

Instructions

- This is an open-book, open-note, closed INTERNET.
- Make sure to use either Firefox or Chrome as the browser to take this exam. Since other browsers may not work properly.
- You are recommended to use a MOUSE for the ease of navigation in different parts of the exam.
- Do not look at anyone else's exam. Do not discuss with anyone the questions of the exam, not even with the TAs. Discussion of questions will be considered as HONOR CODE VIOLATION.
- The exam will consist of true/false, multiple-choice type and Q/A type questions. There will be at least one question where you will have to write code to solve a problem. I recommend you to write the code directly in Bb.
- At the end of the exam, you will NEED to submit your exam to Bb. If you don't hit the submit button then the exam will NOT be submitted for grading.

Results Displayed: All Answers, Submitted Answers, Correct Answers, Feedback, Incorrectly Answered Questions

Question 1

5 out of 5 points

What is the Postfix version of the following expression: ((AX + (B * CY)) / (D E))

Selected Answer: ✓ AX B CY * + D E /

Answers:

AX B CY * + / D E

✓ AX B CY * + D E /

AX B * CY + D E /

AX B CY + * D E /

Question 2

3 out of 3 points

What is the reason for using a "circular queue" instead of a regular one?

Selected Answer: ✓ reuse empty spaces

Answers:

running time of enqueue() is improved

✓ reuse empty spaces

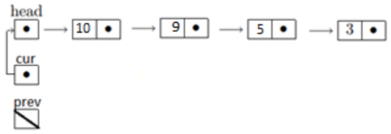
you can traverse all the elements more efficiently

none of the above

Question 3

2 out of 10 points

Given the following sorted linked list, write the code to perform the following operations:



Create a new node (toBeInserted) having value ‘4’ and, find the right position to insert it (between 5 and 3) and insert in the sorted list.

Selected Answer:

```
toBeInserted = new Node(4);
Link  head = head.next();
if(head.next.next < head.next)
insert node
```

Correct Answer: [None]

Response Feedback: [None Given]

Question 4

3 out of 3 points

If the sequence of operations - push (5), push (0), pop, push (9), push (2), pop, pop, pop, push (2), pop are performed on an initially empty stack, the sequence of popped out values is:

Selected Answer: ✓ 02952

Answers: 09225

✓ 02952

09252

50922

Question 5

2 out of 2 points

Finding the max element in an unordered stack would require

Selected Answer: ✓ O(n) operations

Answers:

None of the above

✓ O(n) operations

O(1) operations

O(log n) operations

Question 6

3 out of 3 points

Assuming that A is an interface, which of the following is true?

Selected Answer: ✓ It is possible to declare a variable of type A.

Answers:

It is possible to instantiate an object of type A.

✓ It is possible to declare a variable of type A.

Both are true.

Neither are true.

Question 7

5 out of 5 points

You have a singly linked list constructed out of nodes defined as follows:

```
public class Node {

  public int datum;

  public Node next;

}
```

In the function shown below, the parameter `f` refers to the first node in the linked list, if there is one, and has the value `null` otherwise. The intent of the function is to remove the last node of the linked list.

```
public void removeLast(Node first) {

      Node p, q; p = first;

      q = p.next; while (q.next != null) {
```

```
        p = q;

        q = q.next;

    }

   p.next = null;

 }
```

Which of the following describes the class of linked lists for which this function works correctly?

Selected Answer: ✓ All linked lists with more than one node

Answers:

No linked lists

All nonempty linked lists

All linked lists

Empty linked lists and all linked lists with more than one node

✓ All linked lists with more than one node

Question 8

5 out of 5 points

You have a singly linked list constructed out of nodes defined as follows:

```
public class Node
{
 public int datum;
 public Node next;
}
```

In all of functions shown below, the parameter first refers to the first node in the linked list, if there is one, and has the value null otherwise. Which of the following functions correctly inserts a value x at the front of the linked list and returns a reference to the new front of the linked list?

Selected Answer: ✓

```
public Node insertFront(Node first, int x)
{
  Node n = new Node();
  n.datum = x;
  n.next = first; return n;
}
```

Answers:

```
public Node insertFront(Node first, int x)
{
  first = new Node();
  first.datum = x;
  first.next = first;
  return first;
}
```

✓

```
public Node insertFront(Node first, int x)
{
  Node n = new Node();
  n.datum = x;
  n.next = first; return n;
}
```

Both of the above

None of the above

Response Feedback: Only function II works correctly. Function I loses the reference to the front of the list when it executes the statement: first = new Node(); Because there is no other reference to the front of the list, assigning this new value to first causes the pre-existing nodes in the list to be lost. Function II avoids this problem by using a separate variable n for the new node, and it sets n's next field to the old front of the list. It then returns the value of n, which is a reference to the new front of the list.

Question 9

6 out of 6 points

Suppose we have a circular array implementation of a queue with 2 items. the front = 0 and back = 1. The max capacity of the array is MAX_SIZE = 2.

1. What will the peek operation return to the user? **[A]**

2. What will be the value of front and back after a dequeue operations? **[B]**

3. Where does the push place the new item: **[C]**

Specified Answer for: A ✗ 0

Specified Answer for: B ✗ front = 1, back =1

Specified Answer for: C ✓ queue overflow

Correct Answers for: A

Evaluation Method	Correct Answer	Case Sensitivity
✓ *Contains*	array[0]	
✓ *Contains*	0 position	

Correct Answers for: B

Evaluation Method	Correct Answer	Case Sensitivity
✓ *Contains*	front = 1 back = 1	

Correct Answers for: C

Evaluation Method	Correct Answer	Case Sensitivity
✓ *Contains*	overflow	

Question 10

3 out of 3 points

What is the need for a circular array compared to a non-circular array-based implementation of a queue?

Selected Answer: ✓ Effective usage of memory

Answers: None of the above

✓ Effective usage of memory

Easier computations

All of the mentioned

Question 11

5 out of 5 points

What is the functionality of the following piece of code?

```
public int function(int data){
  Node tmp = head;
  int var = 0;
  while(tmp != null){
     if(tmp.item == data){
        return var;
     }
     var++;
     tmp = tmp.next;
  }
   return -9999;
}
```

Selected Answer: ✓ Find and return the position of the given element in the list otherwise return -9999

Answers: ✓ Find and return the position of the given element in the list otherwise return -9999

Find and insert a new element in the list

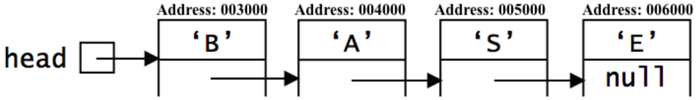
Find and return the given element in the list otherwise return -9999

Find and delete a given element in the list if it exists otherwise return -9999

Question 12

0 out of 5 points

The diagram below shows a linked list of characters, along with two variables that each store a reference/pointer to one of the nodes in the list:



The nodes in the linked list could be implemented using the following class:

```
public class CharNode

{

   public char val;

   public CharNode next;

}
```

Qa. What is the memory location specified by the expression `head.next.next?` **[A]**

Qb. What is the value of the expression from part Qa? **[B]**

Specified Answer for: A ✗ 004000

Specified Answer for: B ✗ 'A'

Correct Answers for: A		
Evaluation Method	**Correct Answer**	**Case Sensitivity**
✓ *Contains*	00500	
Correct Answers for: B		
Evaluation Method	**Correct Answer**	**Case Sensitivity**
✓ *Contains*	S	

Question 13

2 out of 2 points

For the following code, count the number of operations where `some_statement` is executed based on the loops

```
for (int j = 1 ; j < n ; j *= 2) {

 for (int I = 1; i < n ; i++) {

  some_statement ;

} }
```

Selected Answer: ✓ O(n logn)

Answers:

O(n^2)

✓ O(n logn)

O(logn)

O(n)

Question 14

2 out of 2 points

Given a collection of algorithms that runs on O(1), O(n log n), O(n), O(n2), O(log n), O(n!), order

the algorithms from fastest to slowest.

Selected Answer: ✓ O(1), O(log n), O(n), O(n log n), O(n^2), O(n!)

Answers:

O(1), O(n log n), O(n), O(n^2), O(log n), O(n!)

None of the above

O(1), O(log n), O(n log n), O(n), O(n^2), O(n!)

✓ O(1), O(log n), O(n), O(n log n), O(n^2), O(n!)

Question 15

3 out of 3 points

Which of the following is described as “dynamic binding”?

Selected Answer: ✓ The JVM dynamically determines which method to call based on the object’s type at run-time.

Answers:

The contents of variables may change dynamically at run-time.

An object may dynamically change its superclass at run-time.

✓ The JVM dynamically determines which method to call based on the object’s type at run-time.

The JVM dynamically determines which method to call based on the variable's type at run-time.

Question 16

3 out of 3 points

Which of the following best describes the difference between overloading and overriding a method?

Selected Answer: ✓ When one method overrides another, both methods will have the same signature.

Answers:

There is no difference. They mean the same thing.

✓ When one method overrides another, both methods will have the same signature.

When one method overloads another, both methods will have the same signature.

Overloading only makes sense in the context of inheritance.

Question 17

2 out of 2 points

✓ What is the BigO notation (in terms of n) for the following code:

```
void f2(int n) {
     for(int i=0; i < n; i++) {
         for(int j=0; j < 10; j++) {
            for(int k=0; k < n; k++) {
               for(int m=0; m < 10; m++) {
                   System.out.println("!");
        }

      }

    }

  }

}
```

Selected Answer: ✓ $O(n^2)$

Answers:

✓ $O(n^2)$

$O(n^4)$

O(nlogn)

O(n)

Question 18

3 out of 3 points

✓ What data structure can be used to check if a syntax has balanced parenthesis?

Selected Answer: ✓ Stack

Answers:

Tree

✓ Stack

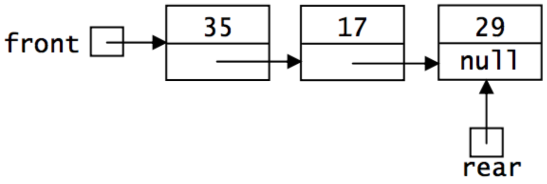
Queue

Linked List

Question 19

0 out of 3 points

✗ The diagram below suggests how we could implement a double-ended linked list, in which we maintain a reference to both the first and last nodes in the linked list.



Which one of the following operations would be inefficient to carry out when there are a large number of elements in the linked list?

Selected Answer: ✗ deletion from the end to which front refers

Answers:

deletion from the end to which front refers

test for an empty linked list

✓ deletion from the end to which rear refers

insertion at the end to which front refers

insertion at the end to which rear refers

Question 20

5 out of 5 points

✓ Evaluate the following expression, showing the state of the stack at each step. 6 5 ∗ 7 3 − 4 8 + ∗ +

Note: You can use each line to show the stack state. You can assume the stack top will refer to the leftmost position.

Selected Answer:

Stack	infix
65*73-48+*+	
5*73-48+*+	(6
73-48+*+	(6*5)
3-48+*+	(6*5) (7
48+*+	(6*5) (7-3)
8+*+	(6*5) (7-3) (4
*+	(6*5) (7-3) (4+8)
	((6*5) + ((7-3) * (4+8))

Correct Answer: [None]

Response Feedback: [None Given]

Question 21

5 out of 5 points

✓ What is the prefix version of the following expression: ((AX + (B * CY)) / (D E))

Selected Answer: ✓ / + AX * B CY D E

Answers:

/ AX + * B CY D E

✓ / + AX * B CY D E

+ / AX B * CY D E

/ + AX B CY * D E

Question 22

5 out of 5 points

Given the code fragment. which of the following expressions has the value null?

```
Node p = new Node(12);

Node q = new Node(5);

p.next = q;

q.next = p;
```

Selected Answer: ✓ none of the above

Answers: ✓ none of the above

q.next

p

p.next.next

Question 23

3 out of 3 points

Given a 5 element queue Q (from front to back: 1, 3, 5, 7, 9), and an empty stack S, remove the elements one-by-one from Q and insert them into S, then remove them one-by-one from S and re-insert them into Q.

Select, what are the contents of the queue now look like (from front to back)?

Selected Answer: ✓ 9, 7, 5, 3, 1

Answers: 9, 7, 5, 1, 3

✓ 9, 7, 5, 3, 1

1, 7, 5, 3, 9

9, 5, 3, 7, 1

Question 24

2 out of 2 points

A method must always catch any exception that is raised when that method is executed.

Selected Answer: ✓ False

Answers: True

✓ False

Question 25

2 out of 2 points

For the following code, count the number of operations where some_statement is executed based on the loops

```
for (int I = 0; I < n; I +=2){

   for (int j = 1; j < n; j++) {

     some_statement;

}}
```

Selected Answer: ✓ $O(n^2)$

Answers: O(n logn)

✓ $O(n^2)$

O(n)

O(log n)

Question 26

2 out of 5 points

A stack S of integers initially contains the following data:

```
6 (top)

2

7

3
```

The following code is then executed:

```
int x = S.pop();

int y = S.pop();

int z = S.pop();

S.push(x + y);

int w = S.pop();

S.push(w + z);
```

After this code has been executed, what are the contents of the stack?

Selected Answer: ✗ 8
10

Answers:

10
8
6
3

15
✓ 3

8
10

10
8

Monday, May 4, 2020 3:20:12 PM EDT

← **OK**