This exam is to be taken by yourself with closed books, closed notes, no electronic devices. You are allowed one side of an 8.5"x11" sheet of paper handwritten by you.
(Partial) Operator Precedence Table

<table>
<thead>
<tr>
<th>Operators</th>
<th>Associativity</th>
</tr>
</thead>
<tbody>
<tr>
<td>! ++ --</td>
<td>(pre &amp; post inc/dec)</td>
</tr>
<tr>
<td>* / %</td>
<td>left to right</td>
</tr>
<tr>
<td>+ -</td>
<td>left to right</td>
</tr>
<tr>
<td>&lt; &lt;= &gt; &gt;=</td>
<td>left to right</td>
</tr>
<tr>
<td>== !=</td>
<td>left to right</td>
</tr>
<tr>
<td>&amp;&amp;</td>
<td></td>
</tr>
<tr>
<td>=</td>
<td>right to left</td>
</tr>
</tbody>
</table>

Which of the following are valid Java identifiers? (Circle your answer(s)).

- quarter_.25
- Half-Time
- 25Cents
- double
- quarter25
- SuperBowl_XLV
- QUARTER_25
- string_cheese

What does the statement `System.out.println( "The answer is: " + (3 + 2) + 1 );` print?

What does the statement `System.out.println( 3 <= 2 );` print?

What does `int x = 20 % 3; System.out.println( x );` print?

What does the statement `System.out.println( "The answer is: " + 3 + 2 + 1 );` print?

What gets printed?

```java
public class M2 {
    public static void main( String[] args ) {
        System.out.println( -1 + 2 - 3 * 5 / 4 );
        System.out.println( 6 + 7 % 11 + 9 * 10 );
    }
}
```

What is printed by the following code?

```java
int foo = 37;
int bar = 42;
boolean foobar = ( foo == bar );
System.out.println( foobar );
bar = 37;
System.out.println( foobar );
System.out.println( foo == bar );
```
Using only the statements below, select the order of the statements to draw an E such that the width of the E is size pixels and the height of the E is twice size pixels. Do not worry about where it is drawing. Assume the turtle is pointing up when the method is called, the pen is down, and it is positioned at the upper left corner of where we want to draw the E. Start drawing the E at the upper left corner of the E. Have the turtle end at the bottom right corner of the E.

Write the letter corresponding to each statement in the correct order to draw an E. Do it in exactly 12 statements.

```
public void drawE( int size )
{
    _________________________________
    _________________________________
    _________________________________
    _________________________________
    _________________________________
    _________________________________
    _________________________________
    _________________________________
    _________________________________
    _________________________________
    _________________________________
    _________________________________
}
```

What gets printed?

```
public class M3
{
    public static void main( String[] args )
    {
        int fire = 4, air = 10;
        fire = fire + (air * 2);
        System.out.println( "fire = " + fire );
        _________________________________
        fire = 6 + air++;
        System.out.println( "fire = " + fire + "; air = " + air );
        _________________________________
        fire = 10;
        air = --fire - 4;
        System.out.println( "fire = " + fire + "; air = " + air );
        _________________________________
    }
}
```
What gets printed?

```java
public class M5 {
    public static void main( String[] args ) {
        final int MAX = 4;
        int i = -1, j = -1;

        for (i = 2; i < MAX; ++i ) {
            for (j = 1; j < MAX; j = j + 2 ) {
                System.out.println( i + " " + j );
            }
        }
        System.out.println( i + " " + j );
    }
}
```

What gets printed if the value of the actual argument passed to this method is 5?

```java
public void m6( int x ) {
    int y = 0;
    if ( x <= 1 )
        y = 3;
    else if ( x <= 2 )
        y = 5;
    else if ( x == 3 || x >= 4 )
        y = 7;
    else
        y = 9;
    System.out.println( y );
}
```

What gets printed if the value of the actual argument passed to this method is 2?

```java
public void m6( int x ) {
    int y = 0;
    if ( x <= 1 )
        y = 3;
    if ( x <= 2 )
        y = 5;
    if ( x == 3 || x >= 4 )
        y = 7;
    else
        y = 9;
    System.out.println( y );
}
```

What gets printed?

```java
public class M7 {
    public static void main( String[] args ) {
        int x = 8;
        int y = 5;
        System.out.println( true && !(x <= y) );
        System.out.println( 4 + x < y );
        System.out.println( false || (y >= 8) );
        System.out.println( ++x < y );
    }
}
```
The following is code using a for loop. Write the equivalent using a while loop.

```java
int x = 15;
for ( int i = 0; i < 5; i++ )
{
    x = x + x;
}
```

What order are pixels changed given this code in Picture.java (assuming all variables are correctly defined and set)? Write the letter of the correct order here:  

```java
Pixel p;
for ( int i = 0; i < this.getWidth(); i++ )
{
    for ( int j = 0; j < this.getHeight(); j++ )
    {
        p = getPixel( i, j );
P.setColor( Color.Black );
    }
}
```

A) L->R;Top->Down  
B) L->R;Bottom->Up  
C) R->L;Top->Down  
D) R->L;Bottom->Up  
E) Top->Down;L->R  
F) Bottom->Up;L->R

Fill in the blanks so the code will change pixels in the order described by pattern C above.

```java
Pixel p;
for ( int ___ = _________________________; ___ _____ _________________________; _____ )
{
    for ( int ___ = _________________________; ___ _____ _________________________; _____ )
    {
        p = getPixel( x, y );
P.setColor( Color.Black );
    }
}
```
What gets printed by the following code? _______

```java
int x = 12;
if ( x > 7 )
{
    x += 3;  // Same as x = x + 3;
} else
    x += 6;
System.out.println( x );
```

What gets printed by the following code? _______

```java
int x = 12;
if ( x < 7 )
{
    x += 3;  // Same as x = x + 3;
} else if ( x <= 10 )
    x += 6;
System.out.println( x );
```

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int x = 12;
if ( x > 7 )
{
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```java
int x = 12;
if ( x > 7 )
{
    x += 3;  // Same as x = x + 3;
}
else if ( x >= 15 )
{
    x += 4;
}
System.out.println( x );
```

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int x = 12;
if ( x > 7 )
{
    x += 3;  // Same as x = x + 3;
}
if ( x <= 12 )
{
    x += 4;
}
System.out.println( x );
```

What gets printed by the following code? _______

```java
int x = 12;
if ( x > 7 )
{
    x += 3;  // Same as x = x + 3;
}
if ( x >= 15 )
{
    x += 4;
}
System.out.println( x );
```

What gets printed by the following code? _______

```java
int x = 12;
if ( x < 7 )
{
    x += 3;  // Same as x = x + 3;
} else
    x += 6;
System.out.println( x );
```
Trace the following program and specify its output.

```java
public class Trace {
    public static void main( String[] args ) {
        foo1();
        System.out.println( "main1" );
        foo2();
        System.out.println( "main2" );
        foo3();
        System.out.println( "main3" );
        foo2();
    }

    public static void foo1() {
        foo2();
        System.out.println( "A" );
    }

    public static void foo2() {
        System.out.println( "B" );
        foo3();
        System.out.println( "C" );
    }

    public static void foo3() {
        System.out.println( "D" );
    }
}
```

How many times does the body of this loop execute? __________

```java
for ( int i = 6; i >= 0; --i ) {
    System.out.println( "CSE8A Rocks! " + i );
}
```

With regards to the loop above, what is the last value of i that is printed? __________

How many times does the body of this loop execute? __________

```java
int i;
for ( i = 0; i < 11; ++i ) {
    System.out.println( "CSE8A Rocks! " + i );
} System.out.println( i );
```

With regards to the loop above, what is the last value of i that is printed inside the loop? __________

What is the value of i that is printed in the statement after the loop? __________