1-hr Test #1 (Feb. 22 (Mon))

Expectations

1. be able to identify programming constructs (e.g. HW 02)
2. be able to write statements to change the movieclip instance's properties (position, size, rotation, alpha, and visibility)
3. be able to write code for frame events, and to handle a given mouse or keyboard interaction
4. be able to identify the instance name to use in code
   For example, give you a screenshot of Flash environment, showing the Property Inspector, you should be able to find out the instance name of the movieclip to use in the code
5. be able to identify which timeline you are working on
   For example, give you a screenshot of Flash environment, you should be able to find out the whether you are working on the main timeline or on the timeline of a movieclip symbol (if so, which symbol)
6. be able to predict the message output from a trace() statement in the code, especially within a loop and if-statement
7. be able to predict the value of a variable and expression, especially within a loop and if-statement
8. be able to write an expression, given an equation or a concept
9. be able to read and write if-statements; with or without logical operators (and, or, not)
10. be able to write function definitions and function calls; including functions that take parameters and returning a value
11. be able to organize code using functions, identify code duplication and rewrite the code using custom-defined functions (e.g. Lab04 and Lab05)
12. be able to create arrays, get the array length, and identify the values of elements in an array, especially a multi-dimensional array (e.g. review questions in Arrays)
13. be able to read and write code using for loop and while loop
14. be able to read and write code for looping an array
15. be able to explain the two syntax of hit test methods of ActionScript, and write code to do collision detection with these methods
16. be able to write code to model gravity
17. be able to distinguish between variables and string literals
18. know how to read and write code that concatenates strings or concatenates strings and variables
Practice Questions

Q1. Write an expression to calculate the average of three variables, a, b, and c.

Q2. Write an expression to generate a random number between -10 and 20.

Q3. Write code to make the tree on stage move constantly to the right at frame rate, 10 pixels at a time.

Q4. Write code to make the tree on stage move down 10 pixels and to the left 10 pixels upon mouse up on it.

Q5. Write if-statement to do the followings.
(a) If both variables a and b are greater than 0, then increment the value of variable c by 1.
(b) If either variables a or b is equal to 0, then increment the value of variable c by 1.

Q6. (a) Write a function definition for a function named calcSum() that calculates the sum of two variables, a and b. The result is stored into a variable named sum. Assume the variables a, b, and sum are already declared in the code. You don't need to declare these variables.
(b) Write a statement to show how to make a function call to this function.

Q7. (a) Write a function definition for a function named calcSum() that calculates the sum of two variables, a and b, and return the value of the sum. Again, assume the variables a, b, and sum are already declared in the code. You don't need to declare these variables.
(b) Write a statement to show the proper way to make a function call to this function.
Q8. 
(a) Write a function definition for a function named `calcSum()` that takes 2 parameters, `a` and `b`, and calculates their sum.

(b) Write a statement to show how to make a function call to this function, passing in two parameters of 9 and 16.

Q9. What will be displayed in the Output window when this code is executed?
```
sum = 0;
for (i = 1; i <= 5; i++)
{
    sum = sum + i;
    trace("i = " + i + "  sum = " + sum);
}
```

Q10. Write a for-loop to sum all the values in an array called `scores`.

Q11. Explain the difference between
```
s = 0;
if (a > 0) s++;
if (b > 0) s++;
```
and
```
s = 0;
if (a > 0) s++;
else if (b > 0) s++;
```

Q12. Rewrite the following for loop into a while loop.
```
s = 0;
for (i = 1; i <= 10; i++)
{
    s += 1;
}
```

Q13. Predict the value of `i` for each of the scenario.

<table>
<thead>
<tr>
<th>choice = 1 and positive = true</th>
<th>What is the value of <code>i</code> after executing the code shown in (a)?</th>
<th>What is the value of <code>i</code> after executing the code shown in (b)?</th>
</tr>
</thead>
<tbody>
<tr>
<td>choice = 2 and positive = true</td>
<td></td>
<td></td>
</tr>
<tr>
<td>choice = 3 and positive = true</td>
<td></td>
<td></td>
</tr>
<tr>
<td>choice = 1 and positive = false</td>
<td></td>
<td></td>
</tr>
<tr>
<td>choice = 2 and positive = false</td>
<td></td>
<td></td>
</tr>
<tr>
<td>choice = 3 and positive = false</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
(a)
\[ i = 1; \]
\[ n = 2; \]
\[ \text{if} (\text{choice} == 1 \&\& \text{positive} == \text{true}) \]
\[ \{ \]
\[ \quad i = n; \]
\[ \} \]
\[ \text{else if} (\text{positive} == \text{false}) \]
\[ \{ \]
\[ \quad i = n * n; \]
\[ \} \]
\[ \text{else if} (\text{choice} == 3) \]
\[ \{ \]
\[ \quad i = n * n * n; \]
\[ \} \]
\[ \text{else} \]
\[ \{ \]
\[ \quad i = 0; \]
\[ \} \]

(b)
\[ i = 1; \]
\[ n = 2; \]
\[ \text{if} (\text{choice} == 1) \]
\[ \{ \]
\[ \quad \text{if} (\text{positive} == \text{true}) \]
\[ \quad \quad i = n; \]
\[ \quad \text{else} \]
\[ \quad \quad i = -n; \]
\[ \} \]
\[ \text{else} \]
\[ \{ \]
\[ \quad \text{if} (\text{positive} == \text{true}) \]
\[ \quad \quad i = n * n; \]
\[ \quad \text{else} \]
\[ \quad \quad i = -n * n; \]
\[ \} \]

Q14. Which of the following if-statements the order of the tests matters?

\[ \text{if} (\text{score} == 1) \ x = n; \]
\[ \text{else if} (\text{score} == 2) \ x = n*n; \]
\[ \text{else if} (\text{score} == 3) \ x = n*n*n; \]
\[ \text{else} \ x = -1; \]
\[ \text{if} (\text{score} < 1) \ x = n; \]
\[ \text{else if} (\text{score} < 2) \ x = n*n; \]
\[ \text{else if} (\text{score} < 3) \ x = n*n*n; \]
\[ \text{else} \ x = -1; \]
Q15. How many times does each of the following loops execute? Assume that \( i \) is not changed in the loop body.

\[
\begin{align*}
&\text{for (i = 1; i <= 10; i++)...} \\
&\text{for (i = 0; i < 10; i++)...} \\
&\text{for (i = 10; i > 0; i--)...} \\
&\text{for (i = -10; i <= 10; i++)...} \\
&\text{for (i = 10; i >= 0; i++)...} \\
&\text{for (i = -10; i <= 10; i = i + 2)...} \\
&\text{for (i = -10; i <= 10; i = i + 3)...}
\end{align*}
\]

Q16. What are the values of \( s \) and \( n \) after the following loops?

(a)

\[
\begin{align*}
s &= 1; \\
n &= 1; \\
\text{while (s < 10)} \\
{&\{ \\
&\quad s = s + n; \\
&\quad n++; \\
&\}}
\end{align*}
\]

(b)

\[
\begin{align*}
s &= 1; \\
\text{for (n = 1; n < 5; n++)} \\
{&\{ \\
&\quad s = s + n; \\
&\}}
\end{align*}
\]

Q17. What do the following loops output in the Output window?

(a)

\[
\begin{align*}
s &= 1; \\
\text{for (n = 1; n <= 5; n++)} \\
{&\{ \\
&\quad s = s + n; \\
&\quad \text{trace(s);} \\
&\}}
\end{align*}
\]

(b)

\[
\begin{align*}
s &= 1; \\
\text{for (n = 1; n <= 5; n++)} \\
{&\{ \\
&\quad s = s + n; \\
&\quad n++; \\
&\quad \text{trace(s + " " + n);} \\
&\}}
\end{align*}
\]

Q18. \Var fruit:Array = new Array("orange", "grape", "apple", "banana");

(a) \Var fruit.length is ________

(b) \Var fruit[2] is __________________________

(c) Write ONE statement to change the element "grape" to "pear".

(d) What is the resulted array \Var fruit after the following statements are executed?

\Var fruit:Array = new Array("orange", "grape", "apple", "banana");
\Var fruit.push("pear");
Q19. Show the two syntax of hit test in ActionScript. Also, briefly explain the difference in terms of what is checked against what for the collision detection.

Q20. Suppose there are two movieclip instances on stage: mc_hero and mc_platform. mc_hero is placed way above the mc_platform on the stage.

(a) Write code to make a movieclip instance, named mc_hero, to fall constantly at frame rate, the value of increy at a time, until it hits the mc_platform. Note: For the purpose of this question, you can use either method of hit test. Hint: You will need to declare a variable called increy and give it a value.

(b) Now, add gravity so that mc_hero falls faster and faster at frame rate. Hints: You will need to declare a constant for gravity and give it a value. Only two additional statements are needed if you have done Part (a) correctly.

Q21. Identify the duplicated code. Organize it using a function and make appropriate function calls in the code.

```actionscript
var increx:int = -5;
var increy:int = Math.random() * 60 - 30;
mc_ball.x = stage.stageWidth;
mc_ball.y = Math.random() * stage.stageHeight;

stage.addEventListener(MouseEvent.MOUSE_MOVE, onMovePaddle);
stage.addEventListener(Event.ENTER_FRAME, onPlayGame);

function onMovePaddle(evt:MouseEvent):void
{
    mc_paddle.y = mouseY;
}

function onPlayGame(evt:Event):void
{
    mc_ball.x += increx;
    mc_ball.y += increy;

    if (mc_ball.x < 0 || mc_ball.x > stage.stageWidth)
    {
        mc_ball.x = stage.stageWidth;
        mc_ball.y = Math.random() * stage.stageHeight;
        increx = -5;
        increy = Math.random() * 60 - 30;
    }
    else if (mc_ball.y < 0 || mc_ball.y > stage.stageHeight)
    {
        increy = -increy;
    }

    if (mc_ball.hitTestObject(mc_paddle))
    {
        increx = 5;
    }
}
```