CompSci 4 Test 1 – Oct 1, 2009

Given below are the world functions.

- **world's details**
  - properties
  - methods
  - functions
  - create new function

- **boolean logic**
  - not \( a \)
  - both \( a \) and \( b \)
  - either \( a \) or \( b \), or both

- **math**
  - \( a + b \)
  - \( a - b \)
  - \( a \times b \)
  - \( a \div b \)
  - \( a > b \)
  - \( a < b \)
  - \( a \leq b \)

- **random**
  - choose true or false with probability of \( 0.5 \) of the time
  - random number

- **string**
  - \( a \) joined with \( b \)
  - what as a string

- **ask user**
  - ask user for a number
  - ask user for yes or no

- **ask user for a string**

- **mouse**
  - mouse distance from left edge
  - mouse distance from top edge

- **time**
  - time elapsed
  - year
  - month of year
  - day of year
  - day of month
  - day of weak
  - day of weak in month
  - is AM
  - is PM
  - hour of AM or PM
  - hour of day
  - minute of hour
  - second of minute
  - advanced math
  - minimum of \( a \) and \( b \)
  - maximum of \( a \) and \( b \)
  - absolute value of \( a \)

- **square root of \( a \)**
  - floor of \( a \)
  - ceiling of \( a \)
  - \( \sin a \)
  - \( \cos a \)
  - \( \tan a \)
  - \( \arccos a \)
  - \( \arcsin a \)
  - \( \arctan a \)
  - \( \arctan 2 a \ b \)
  - \( a \) raised to the \( b \) power
  - natural log of \( a \)
  - \( e \) raised to the \( a \) power
  - IEEERemainder of \( a / b \)
  - round \( a \)
  - \( a \) converted from radians to degrees
  - \( a \) converted from degrees to radians
  - the \( b \)th root of \( a \)
  - right, up, forward
Given below are the chicken properties and methods.

Tiles at the bottom of the Alice window.

Given below are the chicken functions.
1. (3 pts) Consider the following html code.

```html
<html>
<head>
<title>Creative Cup Cakes</title>
</head>

<body>
<h1>Creative Cup Cakes</h1>
<p>We sell cupcakes to fit your imagination and savor your taste buds.</p>
<h3>Yum Yum</h3>
</body>
</html>
```

Which picture corresponds to this code?

A) ![Creative Cup Cakes - Mozilla Firefox](image)

B) ![Creative Cup Cakes - Mozilla Firefox](image)

C) ![Creative Cup Cakes - Mozilla Firefox](image)

D) ![Creative Cup Cakes - Mozilla Firefox](image)

2. (6 pts) Consider the following two lines of html code that is part of an .html page. Page 1 is what the page is suppose to view as and Page 2 is what it currently is viewing as. The name of the file with the cat pictures is cats.jpg

Page 1:

```html
<h1>Cats</h1>
<p>Cats are adorable animals.</p>
<h3>Cats</h3>
```

Page 2:

```html
<h1>Cats</h1>
<p>Cats are adorable animals.</p>
<h3>Cats</h3>
```

The name of the file with the cat pictures is cats.jpg.
<h1>I Love Cats</h1>

<code>&lt;img src=cats.jpg&gt; Cat Picture

Page 1

I Love Cats

Cat Picture

Page 2

I Love Cats

Cat Picture

a) Explain what the error is and give the correct html code to display Page 1.

b) The user wants to click on the picture of the cats to display another page called cats.org. The line below shows how to click on the word "cat" to go to the web page cats.org:

<code>&lt;a href="http://cats.org"> cat &lt;/a&gt;

Give the code for the user to click on the picture cats.jpg and transfer to the web site cats.org.

c) Suppose we have two pictures cats.jpg and dogs.jpg, shown side by side as shown below. Explain how you could display these two pictures side by side on a web page like this:

3. (3 pts) Which of the following did Tim Berners Lee create?

A) Lynx
B) Mosaic
C) Netscape
D) World Wide Web
4. (3 pts) Consider the following list on a web page.

1. NC Cardinal
2. VT Hermit Thrush
   - NY Bluebird
   - TN Mockingbird

Which one of the following is the html code to produce this web page component?

A) `<ol>`
   `</li>`
   `</li>`
   `</li>`
   `</li>`
   `<li>` NC Cardinal `</li>`
   `<li>` VT Hermit Thrush `</li>`
   `<li>` NY Bluebird `</li>`
   `<li>` TN Mockingbird `</li>`
   `</ol>`

B) `<ol>`
   `</li>`
   `</li>`
   `</li>`
   `</li>`
   `<li>` NC Cardinal `</li>`
   `<li>` VT Hermit Thrush `</li>`
   `<li>` NY Bluebird `</li>`
   `<li>` TN Mockingbird `</li>`
   `</ol>`

C) `<ul>`
   `<ol>`
   `<li>` NC Cardinal `</li>`
   `<li>` VT Hermit Thrush `</li>`
   `<li>` NY Bluebird `</li>`
   `<li>` TN Mockingbird `</li>`
   `</ol>`
   `</ul>`

D) `<ul>`
   `<ol>`
   `<li>` NC Cardinal `</li>`
   `<li>` VT Hermit Thrush `</li>`
   `<li>` NY Bluebird `</li>`
   `<li>` TN Mockingbird `</li>`
   `</ol>`
   `</ul>`

5. (3 pts) Consider the following html code.

```
<table border=1>
<tr><td>Bell</td><td>Fleck</td></tr>
<tr><td>Turtel</td><td>Woo</td></tr>
<tr><td>Sieber</td><td>Rofe</td></tr>
<tr><td>Nagi</td><td>Gauch</td></tr>
</table>
```

Which picture corresponds to this code?

A)  

<table>
<thead>
<tr>
<th>Bell</th>
<th>Fleck</th>
<th>Turtel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Woo</td>
<td>Sieber</td>
<td>Rofe</td>
</tr>
<tr>
<td></td>
<td>Nagi</td>
<td>Gauch</td>
</tr>
</tbody>
</table>

B)  

<table>
<thead>
<tr>
<th>Bell</th>
<th>Fleck</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Turtel</td>
</tr>
<tr>
<td></td>
<td>Woo</td>
</tr>
<tr>
<td></td>
<td>Sieber</td>
</tr>
<tr>
<td>Rofe</td>
<td>Nagi</td>
</tr>
<tr>
<td>Gauch</td>
<td></td>
</tr>
</tbody>
</table>

C)  

<table>
<thead>
<tr>
<th>Bell</th>
<th>Fleck</th>
<th>Turtel</th>
<th>Woo</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Sieber</td>
<td>Rofe</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nagi</td>
<td>Gauch</td>
</tr>
</tbody>
</table>

D)  

<table>
<thead>
<tr>
<th>Bell</th>
<th>Fleck</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Turtel</td>
</tr>
<tr>
<td></td>
<td>Woo</td>
</tr>
<tr>
<td></td>
<td>Sieber</td>
</tr>
<tr>
<td>Rofe</td>
<td>Nagi</td>
</tr>
<tr>
<td>Gauch</td>
<td></td>
</tr>
</tbody>
</table>
6. (3 pts) Which one of the following is NOT the way to add a new object to an Alice world?

A) Add a parameter object  
B) Click on a class in the Alice library  
C) Import an object that was saved out of an Alice world  
D) Use the people builder

7. (3 pts) The following pictures show two immediate scenes in an animation of a chicken on a lion with an error when the lion turns (the chicken is no longer on the lion). Explain how the error could have happened and how to fix it.

![Image of chicken on lion with error]

8. (14 pts) Consider the following Alice code in which the lines are numbered.

```
1. toySoldier.say "Who is there?" more...
2. if coach.distance to toySoldier > 8
3. coach.charge amount = 3 player = toySoldier
4. else
5. penguin.turn right lemur.treeDistance theWay = left more...
6. world.DoSomething Saying = "Charge!" distance = 2 move up 1 meter more...
```

A) What type is the argument in line 1?  
B) In line 3, list the words that are arguments.  
C) In line 3, list the words that are parameters.
D) In line 5, list the name of the function and what type of value it returns.

E) Name one function above that is a user-built class function.

F) Explain what must be true for line 5 to be executed when this program runs.

G) In line 6, what type of value does the function `world.DoSomething` return?

9. (4 pts) Consider the following world that has the three objects: tortoise, chicken and penguin (shown below from left to right) and given code. The world has been setup as shown below. The chicken is **exactly 1.0 meter** from the tortoise, and the chicken is **exactly 1.0 meter** from the penguin.

   ![Image of world with objects]

   The diagram below is looking from above over the scene. The tortoise is represented by the T, the chicken is represented by the C, and the penguin is represented by the P. Using the diagram below, draw the path of tortoise as a solid line and the path of penguin as a dashed line.
10. (6 pts) Consider the following `world.Mystery` function.

A) What does `world.Mystery` return when the following call is made?

```python
print(world.mystery(num1=2, num2=1, num3=3)
```

B) What does `world.Mystery` return when the following call is made?

```python
print(world.mystery(num1=7, num2=10, num3=10)
```

C) What does `world.Mystery` return when the following call is made?

```python
print(world.mystery(num1=10, num2=6, num3=1)
```
11. (10 pts) Consider the following Alice world that has two objects: 
alienOnWheels and scientistWoman.

The world starts as shown in the figure above. Write code to do the following in this order.

a) The alienOnWheels should say “Hi”.

b) At the same time, both the scientistWoman and the AlienOnWheels should face each other.

c) The alienOnWheels should move to one meter in front of the scientistWoman. (you don’t need to make his wheels turn).

d) The alienOnWheels should double in size.

e) The scientistWoman’s head should double in size.

f) In 5 seconds, the alienOnWheels should slowly sink into the ground until it is no longer seen.

12. (8 pts) Complete the following class method called jumpOver whose header is shown below. This method has two parameters, an object named “ball,” and a number named “distance.” This method first has the joey face the item, then jumps over the item from where it is to ending up “distance” meters past the item. The height it jumps must be twice the height of the item.
For example, in the first call above, the joey faces the baseball, jumps over the baseball ending up 2 meters past the baseball (achieving height twice the height of the baseball). In the second call, the joey faces the basketball and jumps over it ending up 5 meters past the basketball (achieving twice the height of the basketball).

13. (10 pts) Complete the following function called CanEat that has two parameters, one object named fish, and a color named fishColor, and returns true if the bigFish can eat the fish. BigFish can eat a fish if it is smaller than ¼ the height of bigFish and the fish’s color is fishColor. Return false otherwise.

A) Complete the function below.

B) Give Alice code to determine if BigFish can eat minnow. If BigFish can eat the minnow, he should move close to the minnow (within 0.25 meters), and then have the minnow disappear. Note that BigFish can only eat fish that are smaller than ¼ the size of BigFish and BigFish eats red fish only. You must call the function you wrote in Part A) to receive full credit.
14. (14 pts) Consider an Alice world with three penguins named penguin, penguin2 and penguin3, and two poolcues named poolcue and poolcue2.

A) (4 pts) Complete the following function called `widest` that returns the object (of two objects) that is the widest. This function has two object parameters named `animal` and `animal2` and returns the one of these that is the widest.

B) (5 pts) Complete the following function called `widestOf3` that returns the object (of three objects) that is the widest. To receive full credit you must call the function from part A).

C) (5 pts) Complete the following Alice code. If the widest of three penquins (penguin, penguin2 and penguin3) can fit between the two poolcues (poolcue and poolcue2) then the widest penquin says “I can fit”. Otherwise, the widest penquin says “I’m too big”. To receive full credit you must call the function in Part B.