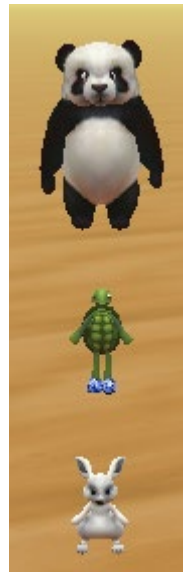


# CompSci 94

## Review: Sample Exam Questions

### November 11, 2021



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# Today is all about practicing writing code

- Write the code on paper, like you will do on the exam





# Problem 1a Procedure (Rewritten Spring 18 Quest 11)

declare procedure **mystery**

with parameters: WholeNumber  $\Rightarrow$  num1 , WholeNumber  $\Rightarrow$  num2 , WholeNumber  $\Rightarrow$  num3

do in order

if  $\{ \text{num1} \leq \text{num2} \}$  is true then

**this** say "number is 5" add detail

else

if  $\{ \text{EITHER } \{ \text{num1} > \text{num3} \} \text{ OR } \{ \text{num1} > \text{num2} \} \}$  is true then

**this** say "number is 6" add detail

else

**this** say "number is 8" add detail

What happens when this code runs?

**this.panda** **mystery** num1:  $\Rightarrow$  3 , num2:  $\Rightarrow$  2 , num3:  $\Rightarrow$  1

# Problem 1b Procedure (Rewritten Spring 18 Quest 11)

```
declare procedure mystery  
with parameters: WholeNumber  $\Rightarrow$  num1 , WholeNumber  $\Rightarrow$  num2 , WholeNumber  $\Rightarrow$  num3  
do in order  
  if  $\{ \text{num1} \leq 2 \}$  is true then  
    this say "number is 5" add detail  
  else  
    if  $\{ \text{EITHER } \{ \text{num1} > \text{num3} \} \text{ OR } \{ \text{num1} > \text{num2} \} \}$  is true then  
      this say "number is 6" add detail  
    else  
      this say "number is 8" add detail
```

What happens when this code runs?

```
this.panda mystery num1: 6 , num2: 6 , num3: 8
```

# Problem 1c Procedure (Rewritten Spring 18 Quest 11)

declare procedure **mystery**

with parameters: WholeNumber  $\Rightarrow$  num1 , WholeNumber  $\Rightarrow$  num2 , WholeNumber  $\Rightarrow$  num3

do in order

if  $\{ \text{num1} \leq \text{num2} \}$  is true then

**this** say "number is 5" add detail

else

if  $\{ \text{EITHER } \{ \text{num1} > \text{num3} \} \text{ OR } \{ \text{num1} > \text{num2} \} \}$  is true then

**this** say "number is 6" add detail

else

**this** say "number is 8" add detail

What happens when this code runs?

**this.panda** mystery num1:  $\Rightarrow$ 0 , num2:  $\Rightarrow$ 1 , num3:  $\Rightarrow$ 3

# Problem 1d Procedure (Rewritten Spring 18 Quest 11)

```
declare procedure mystery  
with parameters: WholeNumber  $\Rightarrow$  num1 , WholeNumber  $\Rightarrow$  num2 , WholeNumber  $\Rightarrow$  num3  
do in order  
  if  $\{ \text{num1} \leq \text{num2} \}$  is true then  
    this say "number is 5" add detail  
  else  
    if  $\{ \text{EITHER } \{ \text{num1} > \text{num3} \} \text{ OR } \{ \text{num1} > \text{num2} \} \}$  is true then  
      this say "number is 6" add detail  
    else  
      this say "number is 8" add detail
```

What happens when this code runs?

```
this.panda mystery num1:  $\Rightarrow$ 7 , num2:  $\Rightarrow$ 9 , num3:  $\Rightarrow$ 3
```



# Problem 2a (rewrite Fall 2018 Question 12)

declare procedure **mystery2**

with parameters: **DecimalNumber** **value**, **DecimalNumber** **amount** Add Parameter...

do in order

```
if EITHER {value} ≥ {3.0} OR {amount} < {1.0} is true then
  if {value} > {amount} is true then
    this say "1" add detail
  else
    this say "2" add detail
else
  if BOTH {value} > {2.0} AND {value} > {amount} is true then
    this say "3" add detail
  else
    this say "4" add detail
```

What happens?

Panda says:

```
this.panda mystery2 value: {1.5}, amount: {2.5}
```

# Problem 2b (rewrite Fall 2018 Question 12)

declare procedure **mystery2**

with parameters:

DecimalNumber

value

DecimalNumber

amount

Add Parameter...

do in order

if EITHER  $\text{value} \geq 3.0$  OR  $\text{amount} < 1.0$  is true then

if  $\text{value} > \text{amount}$  is true then

this say "1" add detail

else

this say "2" add detail

else

if BOTH  $\text{value} > 2.0$  AND  $\text{value} > \text{amount}$  is true then

this say "3" add detail

else

this say "4" add detail

What happens?

Panda says:

this.panda

mystery2

value: 2.5

, amount: 2.0

# Problem 2c (rewrite Fall 2018 Question 12)

declare procedure **mystery2**

with parameters:

DecimalNumber

value

DecimalNumber

amount

Add Parameter...

do in order

if EITHER value  $\geq$  3.0 OR amount  $<$  1.0 is true then

if value  $>$  amount is true then

this say "1" add detail

else

this say "2" add detail

else

if BOTH value  $>$  2.0 AND value  $>$  amount is true then

this say "3" add detail

else

this say "4" add detail

What happens?

Panda says:

this.panda mystery2 value: 2.0 , amount: 0.5



# Problem 3a:

## Write **Tortoise Procedure paintFriend**

- This procedure has **two parameters**
  - One parameter of type **Biped** named **friend**
  - One parameter of type **Paint** named **somePaint**The tortoise and friend turn to face each other. Then the tortoise moves stopping about 0.5 units in front of the friend. Then if the tortoise is taller than the friend, the friend is painted red. Otherwise the friend is painted the color of somePaint.

# Write the procedure paintFriend



The screenshot shows a programming IDE interface. At the top, there is a navigation bar with a yellow hexagon icon and a dropdown arrow. Below this, there are two tabs: "Scene" and "Tortoise". The "Tortoise" tab is active and contains the text "paintFriend ✕". Below the tabs, there is a code editor area. The text in the editor is: "declare procedure paintFriend with parameters: Biped friend , Paint somePaint". The words "Biped", "friend", "Paint", and "somePaint" are highlighted with yellow boxes. To the right of the text, there is a button labeled "Add Paramete".

## 3B) Calling tortoise paintFriend procedure

- Give the call for when the tortoise and pig are to turn and face each other, the tortoise moves over to about half a unit in front of the pig, and then if the tortoise is taller than the pig, then the pig is painted red, otherwise the pig is painted purple.

### 3C) Calling tortoise paintFriend procedure

- Give the call for when the tortoise and bunny are to turn and face each other, the tortoise moves over to about a half a unit in front of the bunny, and then if the tortoise is taller than the bunny, then the bunny is painted red, otherwise the bunny is painted blue.



# Problem 4 (Spring 2018 Exam 1 Question 14)

- Assume there are three objects in an Alice world, a panda, a bunny and a tortoise, and they are floating in the air, one on top of another. Complete the following panda function called `creatureAbove` that has two STurnable parameters, one named `friend1`, and one named `friend2`. This function returns the STurnable object that is highest in the air (panda or friend1 or friend2).

- Here are two possible scenarios. On the left the panda is above tortoise, who is above bunny. On the right the tortoise is above bunny who is above panda. There are other possibilities for the order of the three of them.



# Write the function creatureAbove

```
declare SJointedModel function creatureAbove  
with parameters: SJointedModel friend1 , SJointedModel friend2
```





# Problem 8 (Exam 2 Spring 2018)

- Consider an Alice world with one eagle and an array of penguins named penguins. The penguins in the array have three different heights. The penguins are either small (around 0.40 in height), medium (around .65 in height) or large (around 1.10 in height).



- Write the Scene function `NumberInHeightRange` that has two parameters. The first one is a `DecimalNumber` named `minRange`, and the second one is a `DecimalNumber` named `maxRange`. This function should return the number of penguins whose height is in the range from `minRange` to `maxRange` inclusive.

# Write function

```
declare WholeNumber function NumberInRange  
with parameters: DecimalNumber minRange , DecimalNumber maxRange
```