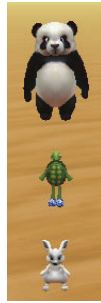


CompSci 94

Review: Sample Exam Questions

November 11, 2021



Prof. Susan Rodger

CompSci 94 Fall 2021

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Today is all about practicing writing code

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

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Problem 1a Procedure (Rewritten Spring 18 Quest 11)

```
declare procedure mystery
with parameters: WholeNumber = num1, WholeNumber = num2, WholeNumber = num3
do in order
  if {num1} ≤ {2} is true then
    {this} say {number is 5} add detail
  else
    if {EITHER {num1} > {num3} OR {num1} > {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: {3}, num2: {2}, num3: {1}
```

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Problem 1a Procedure (Rewritten Spring 18 Quest 11)

```
declare procedure mystery
with parameters: WholeNumber = num1, WholeNumber = num2, WholeNumber = num3
do in order
  if {num1} ≤ {2} is true then
    {this} say {number is 5} add detail
  else
    if {EITHER {num1} > {num3} OR {num1} > {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: {3}, num2: {2}, num3: {1}
```

Panda says number is 6

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Problem 1b Procedure (Rewritten Spring 18 Quest 11)

```
declare procedure mystery
with parameters: WholeNumber = num1, WholeNumber = num2, WholeNumber = num3
do in order
  if {num1} ≤ {2} is true then
    {this} say {number is 5} add detail
  else
    if {EITHER {num1} > {num3} OR {num1} > {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 1b Procedure (Rewritten Spring 18 Quest 11)

```
declare procedure mystery
with parameters: WholeNumber = num1, WholeNumber = num2, WholeNumber = num3
do in order
  if {num1} ≤ {2} is true then
    {this} say {number is 5} add detail
  else
    if {EITHER {num1} > {num3} OR {num1} > {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}
```

Panda says number is 8

Problem 1c Procedure (Rewritten Spring 18 Quest 11)

```
declare procedure mystery
with parameters: WholeNumber = num1, WholeNumber = num2, WholeNumber = num3
do in order
  if {num1} ≤ {2} is true then
    {this} say {number is 5} add detail
  else
    if {EITHER {num1} > {num3} OR {num1} > {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: {0}, num2: {1}, num3: {3}
```

Problem 1c Procedure (Rewritten Spring 18 Quest 11)

```
declare procedure mystery
with parameters: WholeNumber = num1, WholeNumber = num2, WholeNumber = num3
do in order
  if {num1} ≤ {2} is true then
    {this} say {number is 5} add detail
  else
    if {EITHER {num1} > {num3} OR {num1} > {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: {0}, num2: {1}, num3: {3}
```

Panda says number is 5

Problem 1d Procedure (Rewritten Spring 18 Quest 11)

```
declare procedure mystery
with parameters: WholeNumber = num1, WholeNumber = num2, WholeNumber = num3
do in order
  if { num1 ≤ num2 } is true then
    { this say "number is 5" } add detail
  else
    if { EITHER { num1 > num3 } OR { num1 > 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: 7, num2: 9, num3: 3
```

Problem 1d Procedure (Rewritten Spring 18 Quest 11)

```
declare procedure mystery
with parameters: WholeNumber = num1, WholeNumber = num2, WholeNumber = num3
do in order
  if { num1 ≤ num2 } is true then
    { this say "number is 5" } add detail
  else
    if { EITHER { num1 > num3 } OR { num1 > 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: 7, num2: 9, num3: 3
```

Panda says number is 6

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?

this.panda mystery2 value: 1.5, amount: 2.5

Panda says:

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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?

this.panda mystery2 value: 1.5, amount: 2.5

Panda says: 4

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Problem 2b (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?

this.panda mystery2 value: 2.5, amount: 2.0

Panda says:

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Problem 2b (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?

this.panda mystery2 value: 2.5, amount: 2.0

Panda says: 3

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Problem 2c (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? **this.panda mystery2 value: 2.0, amount: 0.5**

Panda says:

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Problem 2c (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? **this.panda mystery2 value: 2.0, amount: 0.5**

What happens?

Panda says: 1

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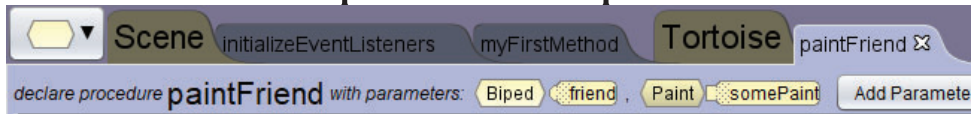
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Problem 3a:

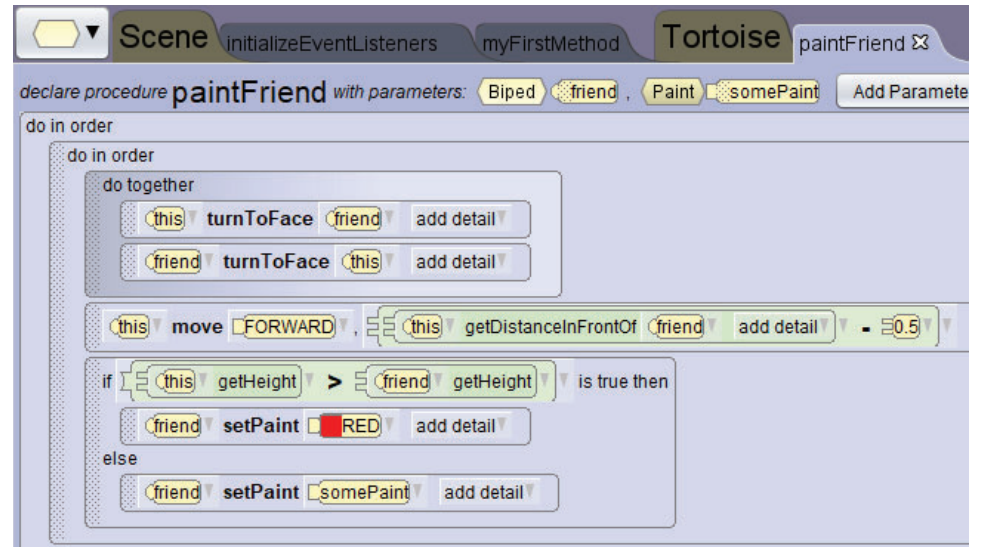
Write **Tortoise** Procedure **paintFriend**

- 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

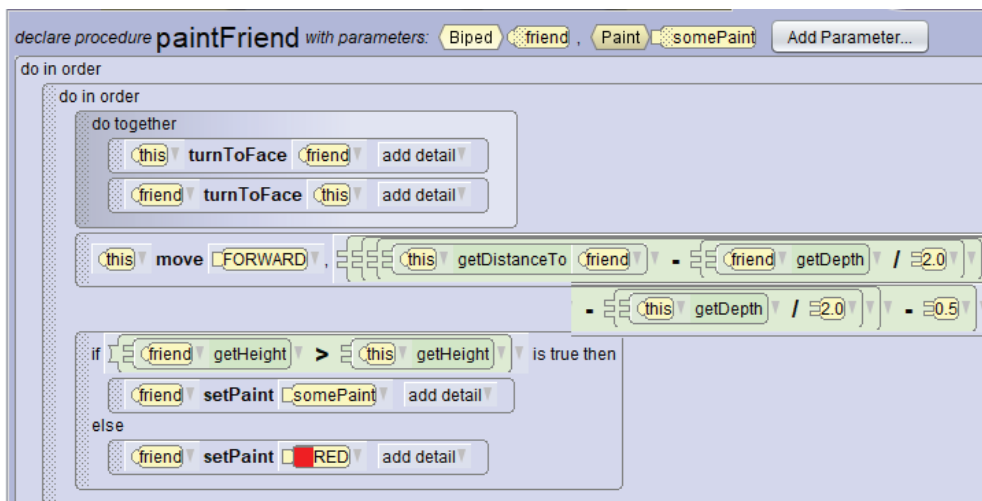


A solution



Another Solution

*Move forward is different.
The if statement is different.*



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.

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 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.

```
this.tortoise paintFriend friend: this.pig , somePaint: 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.

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 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.

```
this.tortoise paintFriend friend: this.bunny , somePaint: 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
```

Write the function creatureAbove

```
declare SJointedModel function creatureAbove  
with parameters: SJointedModel friend1, SJointedModel friend2 Add Parameter...  
do in order  
if BOTH friend1 isAbove this add detail AND friend2 isAbove this  
if friend1 isAbove friend2 add detail is true then  
return friend1  
else  
return friend2  
else  
if friend2 isAbove this add detail is true then  
return friend2  
else  
if friend1 isAbove this add detail is true then  
return friend1  
else  
drop statement here  
return this
```


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.

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Write function

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

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Write function

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

```
WholeNumber count = 0
for each Flyer someOne in penguins
  if someOne getHeight >= minRange
    if someOne getHeight <= maxRange is true
      count = count + 1
loop
return count
```

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