

Quiz 4

Questions 1 - 4 (6 versions for #1, 4 versions for #2-4)

1. `c = ???`
`c.push a'`
`c.unshift b'`
`c.push c'`
`c.pop`
`c += [d']`
`ans = c == [b', x', y' a', d']`

<code>a', b', c', d'</code>	<code>x', y'</code>	<code>???</code>
4, 2, 0, 10	1, 5	1, 5
4, 2, 0, 10	3, 0	3, 0
4, 2, 0, 10	6, 8	6, 8
9, 0, 4, 3	5, 7	5, 7
9, 0, 4, 3	2, 4	2, 4
9, 0, 4, 3	1, 1	1, 1

2. `x = x'`
`???.times {x = x + 1}`
`ans = x == z'`

<code>x'</code>	<code>z'</code>	<code>???</code>
1	8	7
1	4	3
3	8	5
3	6	3

```

3. t = ???
   s = t.size
   r = t.any? {|x| p'}
   ans = s > s' and r

```

p'	s'	???
x > 5	2	any array with at least three elements, at least one of which is greater than 5, e.g. [4, 5, 6]
x > 3	2	any array with at least three elements, at least one of which is greater than 3, e.g. [2, 3, 4]
x < 5	3	any array with at least four elements, at least one of which is less than 5, e.g. [4, 5, 6, 7]
x < 3	3	any array with at least four elements, at least one of which is less than 3, e.g. [2, 3, 4, 5]

```

4. a = [0, 1, 2, 3, 4]
   b = a.map ???
   ans = b == b'

```

b'	???
[-5, -4, -3, -2, -1]	{ x x - 5}
[0, -1, -2, -3, -4]	{ x x * -1}
[0, 2, 4, 6, 8]	{ x x * 2}
[1, 2, 3, 4, 5]	{ x x + 1}

Question 5-7

```

5. class Number
   def <=> other
     @val <=> other.val
   end
end

```

```

6. class MyInt < Number
  def add other
    other.addInt self
  end

  def addInt other
    MyInt.new (self.val + other.val)
  end

  def addFloat other
    MyInt.new (self.val + other.val.truncate)
  end
end

class MyFloat < Number
  def add other
    other.addFloat self
  end

  def addInt other
    MyInt.new(self.val.truncate + other.val)
  end

  def addFloat other
    MyFloat.new(self.val + other.val)
  end
end

7. class Number
  def times n
    if n == 1
      self
    else
      self.add (self.times (n - 1))
    end
  end
end

```

Questions 8-10 (each student saw three of five)

<code>{a : int} <: {a : real}</code>	False
<code>{a : int} <: {b : int}</code>	False
<code>{a : int} <: {a : int}</code>	True
<code>{a : int, b : real} <: {b : real, a : int}</code>	True
<code>{a : int, b : real} <: {a : real, b : int}</code>	False

Questions 11-12 (each student saw two of five)

<code>{a : int} <: {a : int, b : int}</code>	False
<code>{a : int, b : int} <: {a : int}</code>	True
<code>{a : int, c : int} <: {a : int, b : int}</code>	False
<code>{a : int, c : int} <: {a : int, b : int, c : real}</code>	False
<code>{a : int, c : int} <: {a : int, b : real, c : int}</code>	False

Questions 13-15 (each student saw three of five)

<code>{a : int} <: {a : {x : int}}</code>	False
<code>{a : {x : int}} <: {a : {x : int, y : int}}</code>	False
<code>{a : {x : int}} <: {a : {x : int}, b : {y : int}}</code>	False
<code>{a : int} <: {a : int, b : {x : int}}</code>	False
<code>{a : {x : int}} <: {a : {x : real}}</code>	False

Questions 16-17 (each student saw two of four)

<code>{a : int} -> {b : int} <: {a : int} -> {b : int, c : int}</code>	False
<code>{a : int} -> {b : int, c : int} <: {a : int} -> {b : int}</code>	True
<code>{a : int, c : int} -> {b : int} <: {a : int} -> {b : int}</code>	False
<code>{a : int} -> {b : int} <: {a : int, c : int} -> {b : int}</code>	True