

< Previous

Next >

Quiz Overview



For this multiple choice design quiz, download the [starter](#) and complete the problems.

Once you have finished, answer the multiple choice questions about your design.

Unlike the lecture questions, you will only have one attempt to answer each question in the quiz, so make sure to read each answer carefully before selecting one and pressing submit.

Question 1

1/1 point (graded)

Questions 1-6 deal with Problem 1 in the [starter](#) file.

Which of the following is a valid question to determine if we are in the trivial case?


- ☐ `(> n CUT-OFF)`
- ☐ `(= n CUT-OFF)`
- ☒ `(<= n CUT-OFF)`
- ☐ `(<= (/ n 2) CUT-OFF)`



Explanation

If n is less than or equal to the cut-off value we want the trivial answer rather than the recursion. If we use `(= n CUT-OFF)`, we could skip past the CUT-OFF, and then the recursion would not terminate.

Submit You have used 1 of 1 attempt

 Show Answer

 Answers are displayed within the problem

Question 2

1/1 point (graded)

Which of the following is the trivial-answer?


- ☐ `(circle n "outline" "black")`
- ☒ `(circle n "outline" c)`
- ☐ `(beside (circle n "outline" "black") (circle n "outline" "black"))`
- ☐ `(circle c "outline" n)`



Explanation

The trivial case is a circle of size n and colour c

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 Answers are displayed within the problem

Question 3

1/1 point (graded)

Which of the following is the non-trivial answer?

- ☒

```
(local [(define sub (circle-fractal (/ n 2) c))]  
  (overlay (circle n "outline" c)  
    (beside sub sub)))
```

⌂

```
(local [(define sub (circle-fractal (/ n 4) c))]  
  (overlay (circle n "outline" c)  
    (beside sub sub)))
```

⌂

```
(local [(define sub (circle-fractal (/ n 3) c))]  
  (overlay sub  
    (beside sub sub)))
```

⌂

```
(local [(define sub (circle (/ n 2) "outline" c))]  
  (overlay (circle n "outline" c)  
    (beside sub sub)))
```



Explanation

In order to create the fractal, we put two circles of size $n/2$ inside the circle of size n , until we reach the trivial case.

Submit

You have used 1 of 2 attempts

Save

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Answer

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Questions 4-6

3/3 points (graded)

These three questions have to do with your termination argument for `circle-fractal`

What is the base case?

⌂ CUT-OFF

⌂ ($\leq n$ CUT-OFF)

⌂ (circle n "outline" c)



Explanation

We reach the base case when n is less than CUT-OFF

What is the reduction step?

⌂ sub

⌂ (circle-fractal n)

⌂ (circle-fractal ($/ n 2$))

⌂ ($/ n 2$)



Explanation

In the reductions step we call the recursion on $n/2$

What is the argument that with repeated application of the reduction step you will reach the base case?

⌂ with repeated division by 2, n will eventually be less than CUT-OFF

⌂ as long as CUT-OFF > 0 , with repeated division by 2, n will eventually be less than CUT-OFF

⌂ as long as CUT-OFF > 0 and $n > 0$ with repeated division by 2, n will eventually be less than CUT-OFF

⌂ as long as CUT-OFF ≥ 0 and $n > 0$ with repeated division by 2, n will eventually be less than CUT-OFF



Explanation

If n and CUT-OFF are both greater than 0, dividing n by two will eventually produce a value less than CUT-OFF

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You have used 1 of 2 attempts

Save

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Answer

 Answers are displayed within the problem

Question 7

1/1 point (graded)

Questions 7-8 deal with Problem 2 in the starter file.

While it may be possible to get to these answers using combinatorics, we encourage you to use the `solve` function you were asked to design.

How many boards are reachable from B0?

✓ Answer: 512

512


Explanation

There are 512 possible ways to fill the empty board

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You have used 1 of 1 attempt

 Show Answer

 Answers are displayed within the problem

Question 8

1/1 point (graded)

How many boards are reachable from B1?

✓ Answer: 8

8


Explanation

There are 8 possible ways to fill B1

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You have used 1 of 1 attempt

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 Answers are displayed within the problem

Question 9

1/1 point (graded)

Questions 9-10 deal with Problem 3 in the starter file.

How many valid boards (using the description of valid from Problem 3) are reachable from B0?

✓ Answer: 126

126

Explanation

There are 126 possible ways to fill the empty board with 5 Xs and 4 Os

Submit

You have used 1 of 1 attempt

 Show Answer

 Answers are displayed within the problem

Question 10

1/1 point (graded)

Questions 9-10 deal with Problem 3 in the starter.

How many valid boards (using the description of valid from Problem 3) are reachable from B1?

✓ Answer: 3

3

Explanation

There are 3 possible ways to complete this board so it has 5 Xs and 4 Os

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◀ Previous

Next ▶

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