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CSC 344

First Racket Programming Assignment Solution

Learning Abstract

This assignment features relatively simple interactions in the Racket programming language. In fact, all of the computations take place within the interactions pane of the DrRacket PDE. In the first part of this assignment I learned a little bit about numeric computations in Lisp. The next two parts of the assignment featured a square tile which was blue except for a centered red dot. In the second part of the assignment I mimicked the solution of the problem of finding the area of the tile which was blue. In the third part I mimicked the computational rendering of the tile. The last two parts of the assignment featured an image consisting of 5 concentric circles. In the fourth part of this assignment I rendered the image. In the fifth part I computed a percentage based on the concentric circles image that is blue. Throughout the problem solving parts of this assignment the concept of binding values to variables was a predominant theme.

> Interaction: Simple Numeric Processing

```
Welcome to DrRacket, version 8.2 [cs].
Language: racket, with debugging; memory limit: 256 MB.
> x
x: undefined;
 cannot reference an identifier before its definition
> 55
55
> 55.2
55.2
> pi
3.141592653589793
> ( * 3 8 )
24
> ( expt 2 8 )
256
> ( * pi ( expt 7 2 ) )
153.93804002589985
> ( expt 9 50 )
515377520732011331036461129765621272702107522001
>
```

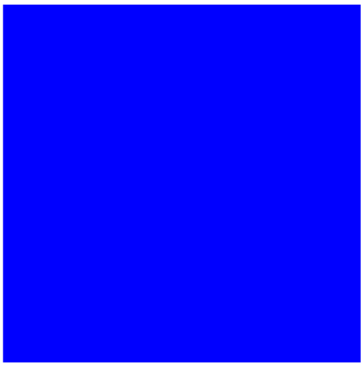
> Interaction: Solution to the blue and red tile area problem

---

```
Welcome to DrRacket, version 8.2 [cs].
Language: Determine language from source; memory limit: 256 MB.
> ( define side-of-tile 200 )
> ( define diameter-of-dot ( / side-of-tile 3 ) )
> ( define radius-of-dot ( / diameter-of-dot 2 ) )
> ( define total-tile-area ( expt side-of-tile 2 ) )
> ( define red-dot-area ( * pi ( expt radius-of-dot 2 ) ) )
> ( define blue-tile-area ( - total-tile-area red-dot-area ) )
> side-of-tile
200
> diameter-of-dot
66 2/3
> radius-of-dot
33 1/3
> total-tile-area
40000
> red-dot-area
3490.658503988659
> blue-tile-area
36509.341496011344
>
```

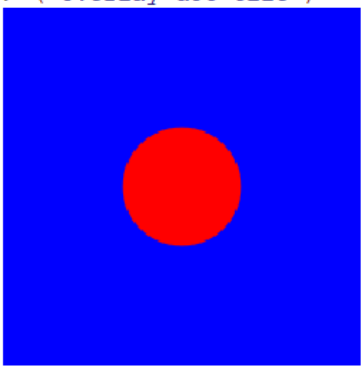
>Interaction: Painting the blue and red tile

```
Welcome to DrRacket, version 8.2 [cs].
Language: Determine language from source; memory limit: 256 MB.
> ( require 2htdp/image )
> ( define side-of-tile 200 )
> ( define diameter-of-dot ( / side-of-tile 3 ) )
> ( define radius-of-dot ( / diameter-of-dot 2 ) )
> ( define tile ( square side-of-tile "solid" "blue" ) )
> tile
```



```
> ( define dot ( circle radius-of-dot "solid" "red" ) )
> dot
```

```
> ( overlay dot tile )
```



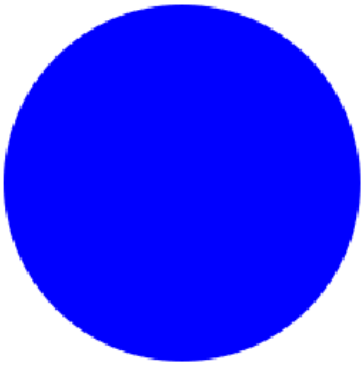
```
>
```

> Interaction: Painting the blue and red concentric disks image

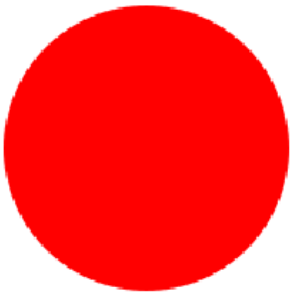
---

Language: Determine language from source; memory limit: 256 MB.

```
> ( require 2htdp/image )
> ( define radius-one 100 )
> ( define first-blue ( circle radius-one "solid" "blue" ) )
> first-blue
```



```
> ( define radius-two 80 )
> ( define first-red ( circle radius-two "solid" "red" ) )
> first-red
```

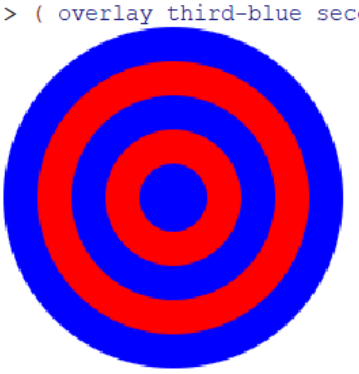


```
> ( define radius-three 60 )
> ( define second-blue ( circle radius-three "solid" "blue" ) )
> second-blue
```

```
> ( define radius-four 40 )
> ( define second-red ( circle radius-four "solid" "red" ) )
> second-red
```

```
> ( define radius-five 20 )
> ( define third-blue ( circle radius-five "solid" "blue" ) )
> third-blue
```

```
> ( overlay third-blue second-red second-blue first-red first-blue )
```



```
>
```

> Interaction: Computing the area of the concentric disks image which is blue

---

```
> ( define first-blue-area ( * pi ( expt radius-one 2 ) ) )
> first-blue-area
31415.926535897932
> ( define first-red-area ( * pi ( expt radius-two 2 ) ) )
> first-red-area
20106.192982974677
> ( define extract-first-blue ( - first-blue-area first-red-area ) )
> extract-first-blue
11309.733552923255
> ( define second-blue-area ( * pi ( expt radius-three 2 ) ) )
> second-blue-area
11309.733552923255
> ( define second-red-area ( * pi ( expt radius-four 2 ) ) )
> second-red-area
5026.548245743669
> ( define extract-second-blue ( - second-blue-area second-red-area ) )
> extract-second-blue
6283.185307179586
> ( define third-blue-area ( * pi ( expt radius-five 2 ) ) )
> ( define total-blue-area ( + extract-first-blue extract-second-blue third blue area ) )
```

```
 blue: undefined;
 cannot reference an identifier before its definition
> ( define total-blue-area ( + extract-first-blue extract-second-blue third-blue-area ) )
> total-blue-area
18849.55592153876
>
```