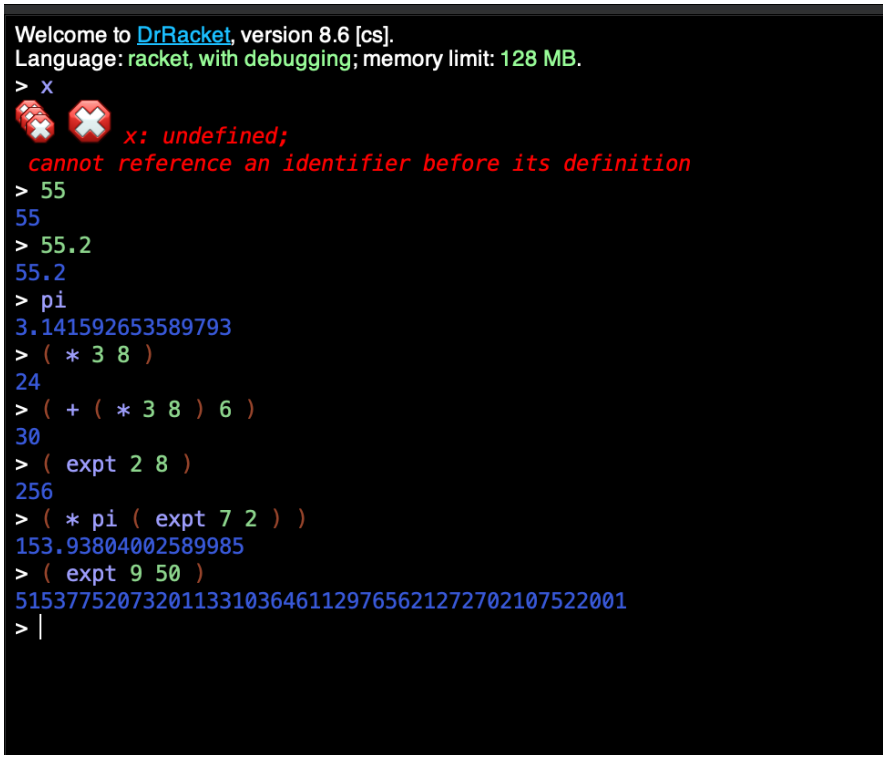
Racket Programming Assignment #1: First Interactions

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 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 squares. In the fourth part of this assignment I rendered the image. In the fifth part I computed a percentage based on the concentric squares image. Throughout the problem solving parts of this assignment the concept of binding values to variables was a predominant theme.

Simple Numeric Computations:

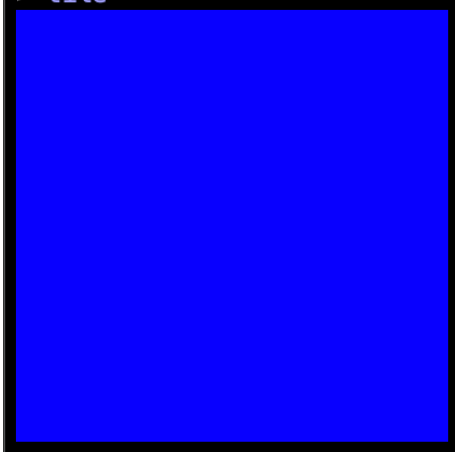


Solution to the blue and red tile problem:

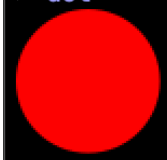
```
Welcome to DrRacket, version 8.6 [cs].
Language: racket, with debugging; memory limit: 128 MB.
> ( define side-of-tile 200 )
> ( define diameter-of-dot ( / side-of-tile 3 ) )
> ( define radius-of-dot ( / diameter-of-dot 2 ) )
> ( define total-tile-area ( expt side-of-tile 2 ) )
> ( define red-dot-area ( * 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
>
```

Painting the blue and red tile:

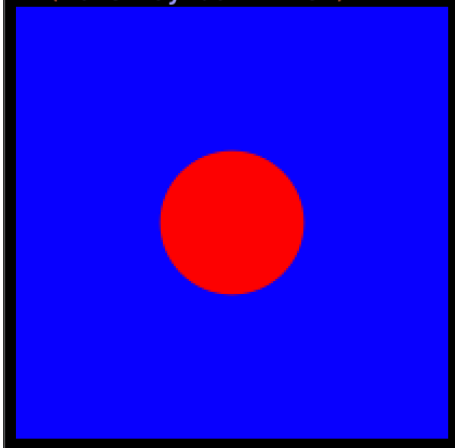
```
Welcome to DrRacket, version 8.6 [cs].
Language: racket, with debugging; memory limit: 128 MB.
> ( require 2htdp/image )
> ( define side-of-tile 200 )
> ( define diameter-of-dot ( / side-of-tile 3 ) )
> ( define radius-of-dot ( / diameter-of-dot 2 ) )
> ( define tile ( square side-of-tile "solid" "blue" ) )
> tile
```



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



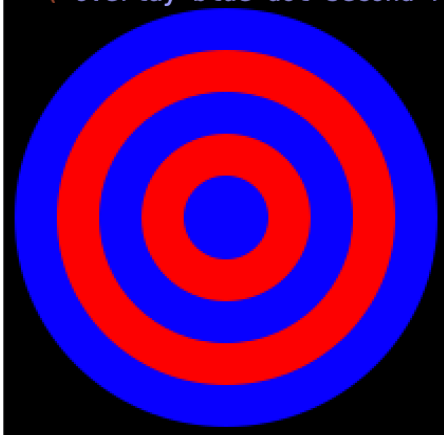
```
> ( overlay dot tile )
```



```
>
```

Painting the blue and red concentric disk image:

```
Welcome to DrRacket, version 8.6 [cs].
Language: racket, with debugging; memory limit: 128 MB.
> ( require 2htdp/image )
> ( define radius-blue-circle 100 )
> ( define blue-circle ( circle radius-blue-circle "solid" "blue" ) )
> ( define radius-red-circle 80 )
> ( define red-circle ( circle radius-red-circle "solid" "red" ) )
> ( define radius-second-blue-circle 60 )
> ( define second-blue-circle ( circle radius-second-blue-circle "solid" "blue" ) )
> ( define radius-second-red-circle 40 )
> ( define second-red-circle ( circle radius-second-red-circle "solid" "red" ) )
> ( define radius-blue-dot 20 )
> ( define blue-dot ( circle radius-blue-dot "solid" "blue" ) )
> ( overlay blue-dot second-red-circle second-blue-circle red-circle blue-circle )
```



```
>
```

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

```
Welcome to DrRacket, version 8.6 [cs].
Language: racket, with debugging; memory limit: 128 MB.
> ( define radius-blue-circle 100 )
> ( define radius-red-circle 80 )
> ( define radius-second-blue-circle 60 )
> ( define radius-second-red-circle 40 )
> ( define radius-blue-dot 20 )
> ( define area-blue-circle ( * pi ( expt radius-blue-circle 2 ) ) )
> ( define area-red-circle ( * pi ( expt radius-red-circle 2 ) ) )
> ( define area-second-blue-circle ( * pi ( expt radius-second-blue-circle 2 ) ) )
> ( define area-second-red-circle ( * pi ( expt radius-second-red-circle 2 ) ) )
> ( define area-blue-dot ( * pi ( expt radius-blue-dot 2 ) ) )
> ( define show-area-blue-circle ( - area-blue-circle area-red-circle ) )
> ( define show-area-red-circle ( - area-red-circle area-second-blue-circle ) )
> ( define show-area-second-blue-circle ( - area-second-blue-circle area-second-red-circle ) )
> ( define show-area-second-red-circle ( - area-second-red-circle area-blue-dot ) )
> ( define show-area-blue-dot ( * pi ( expt radius-blue-dot 2 ) ) )
> ( define show-blue-area ( + show-area-blue-circle show-area-second-blue-circle show-area-blue-dot ) )
> show-area-blue-circle
11309.733552923255
> show-area-second-blue-circle
6283.185307179586
> show-area-blue-dot
1256.6370614359173
> show-blue-area
18849.55592153876
>
```