随机模拟方法与应用导论作业四

陈稼霖 *45875852*

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4.5 (Drawing houses)

The following function house plots an outline of a house centered about the point `(x, y)`:

```
house=function(x, y, ...){
lines(c(x - 1, x + 1, x + 1, x - 1, x - 1),
c(y - 1, y - 1, y + 1, y + 1, y - 1), ...)
lines(c(x - 1, x, x + 1), c(y + 1, y + 2, y + 1), ...)
lines(c(x - 0.3, x + 0.3, x + 0.3, x - 0.3, x - 0.3),
c(y - 1, y - 1, y + 0.4, y + 0.4, y - 1), ...)
}
```

a. Read the function house into R.

b. Use the `plot.new` function to open a new plot window. Using the `plot.window` function, set up a coordinate system where the horizontal and vertical scales both range from 0 to 10.

c. Using three applications of the function house, draw three houses on the current plot window centered at the locations $(1, 1)$, $(4, 2)$, and $(7, 6)$.

d. Using the `...` argument, one is able to pass along parameters that modify attributes of the `line` function. For example, if one was interested in drawing a red house using thick lines at the location $(2, 7)$, one can type

```
house(2, 7, col="red", lwd=3)
```

Using the `col` and `lty` arguments, draw three additional houses on the current plot window at different locations, colors, and line types.

e. Draw a boundary `box` about the current plot window using the box function.

a. 将上述方程读入R

```
house=function(x, y, ...){
lines(c(x - 1, x + 1, x + 1, x - 1, x - 1),
c(y - 1, y - 1, y + 1, y + 1, y - 1), ...)
lines(c(x - 1, x, x + 1), c(y + 1, y + 2, y + 1), ...)
lines(c(x - 0.3, x + 0.3, x + 0.3, x - 0.3, x - 0.3),
```

```
c(y - 1, y - 1, y + 0.4, y + 0.4, y - 1), ...)
}
```

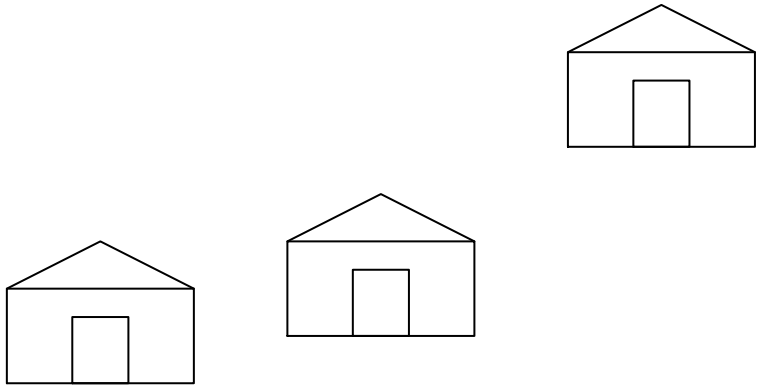
b. 用plot.new函数新建一个绘图窗口，然后用plot.window函数设定横纵范围均为0到10的坐标系

```
plot.new()
```

```
plot.window(xlim = c(0,10),ylim = c(0,10))
```

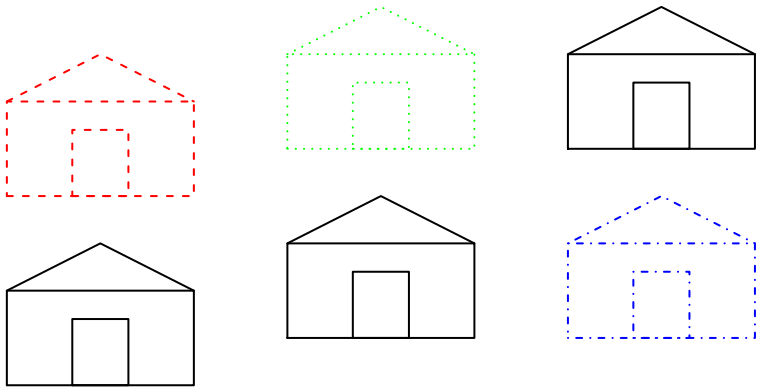
c. 用上面定义的house函数绘制三个中心分别在$(1,1)$，$(4,2)$和$(7,6)$的房子

```
plot.new()
plot.window(xlim = c(0,10),ylim = c(0,10))
house(1,1)
house(4,2)
house(7,6)
```



d. 通过向...中输入参数，额外绘制三个具有不同位置、颜色和线条类型的房子

```
plot.new()
plot.window(xlim = c(0,10),ylim = c(0,10))
house(1,1)
house(4,2)
house(7,6)
house(1,5,col = 'red',lty = 'dashed')
house(4,6,col = 'green',lty = 'dotted')
house(7,2,col = 'blue',lty = 'dotdash')
```



e. 用box函数绘制当前绘图窗口的边界

```
plot.new()
plot.window(xlim = c(0,10),ylim = c(0,10))
house(1,1)
house(4,2)
house(7,6)
house(1,5,col = 'red',lty = 'dashed')
house(4,6,col = 'green',lty = 'dotted')
house(7,2,col = 'blue',lty = 'dotdash')
box()
```