

1.2. Simple programming

1. Writing functions:

(a) Control flow

(b) Loops

(a) Control flow:

If, else if, else:

```
If (case 1){ expressions}
else if (case 2){ expressions}
:
else{ last expressions}
```

Example (Splus):

```
pig=function(){
    if (x >= 0){
        print("You are a pig")
    }
    else{
        print("I am a pig")
    }
}
x= -1
pig()
x= 3
pig()
```

Note:

&&: and

||: or

Note:

Multiple conditions can be used within if statements. The syntax is

```
if (condition 1 && condition 2){ expressions }
if(condition 1 || condition 2){ expressions }
```

(b) Loops:

There are 3 statements for loop. The syntaxes are

- I. **for (variable in expression) { expressions }**
- II. **repeat{**
 expressions
 if (condition) break
 expressions
 }
- III. **while (condition){ expressions }**

Example (Splus):

```
for (j in 1:10)
{
    print(j)                      # loop using for
}
for (j in 2:7)
{
    print(j)                      # loop using for
    print("Hi")
}

j=1
repeat
{
    print(j)
    j=j+1                         # loop using repeat
    if (j > 10)  break
}

j=1
while (j < 11)
{
    print(j)                      # loop using while
    j=j+1
}
```

2. Specifying argument lists:

Example (Splus):

```
pig=function(x)
{
  if (x >= 0){ print("You are a pig") }
  else{ print("I am a pig") }
}

pig(3)
pig(-2)

add=function(x)
{
  s=0
  for (j in 1:x)
  {
    s=s+j
  }
  print(s)
  s
}

add(10)
x1=add(10)
x1

arith1=function(x)
{
  a=sum(x)
  m=prod(x)
  list(suma=a,prodm=m)
}

b=1:5
arith1(b)
s1=arith1(b)
s1$suma
s1$prod
arith2=function(x=1:10,y)
{
  a=sum(x)
  m=prod(y)
  list(suma=a,prod=m)
```

```
}
d=3:9
arith2(b,d)
arith2(y=d)
arith2(d)
arith3=function(y,x=1:10)
{
  a=sum(x)
  m=prod(y)
  list(suma=a,prodm=m)
}
arith3(b,d)
arith3(d)
t.test
help(t.test)
```

Useful links:

Open Couresware :

MIT: <http://ocw.mit.edu/index.htm>

Taiwan: <https://www.tocec.org.tw/web/index.jsp>

NCTU: <http://ocw.nctu.edu.tw/>