

Today

- Still programming focused!
- C **for** repetition structure (cont)
- C arrays
- Other structures in C & Python
- Functions

C **for** and arrays

See code

Structured programming

- Sequence structure
- Selection structure (conditional, branches)
- Repetition structure (iteration, loops)

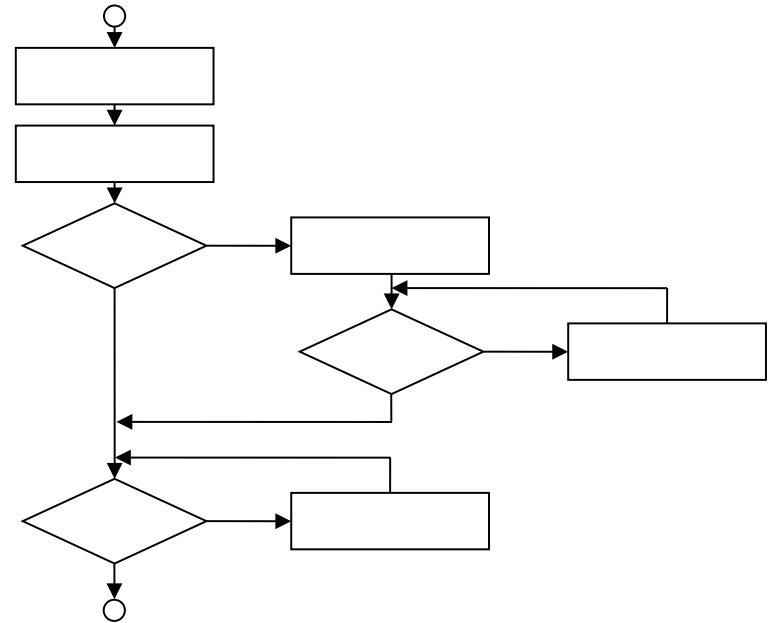
Combining control structures

Stacking

- one after another

Nesting

- one inside another



These are all the programming tools you need to solve any (solvable) problem!

Next: additional, powerful programming tools for convenience or to solve specific problems.

R selection structures

if single selection structure

```
if ( condition ) {  
    expression  
}
```

if-else double selection structure

```
if ( condition ) {  
    expression1  
} else {  
    expression2  
}
```

if-else if multiple selection structure

```
if ( condition ) {  
    expression1  
} else if {  
    expression2  
} else {  
    expression3  
}
```

R repetition structures in practice

while sentinel control

```
while ( condition ) {  
  expression  
}
```

for counter control

```
for ( i in 1:n ) {  
  expression  
}
```

until sentinel control

```
while ( !condition ) {  
  expression  
}
```

foreach collection control

```
for ( item in collection ) {  
  expression  
}
```

do-while sentinel control (e.g. option 4)

```
repeat {  
  expression  
  if ( !condition ) break  
}
```

C selection structures

if single selection structure

```
if ( condition ) {  
    expression;  
}
```

if-else double selection structure

```
if ( condition ) {  
    expression1;  
} else {  
    expression2;  
}
```

if-else if multiple selection structure

```
if ( condition ) {  
    expression1;  
} else if {  
    expression2;  
} else {  
    expression3;  
}
```

C repetition structures in practice

while sentinel control

```
while ( condition ) {  
    expression;  
}
```

until sentinel control

```
while ( !condition ) {  
    expression;  
}
```

do-while sentinel control

```
do {  
    expression;  
} while ( condition )
```

do-until sentinel control

```
do {  
    expression;  
} while ( !condition )
```

for counter control

```
for ( int i=0; i < n; i++ ) {  
    expression;  
}
```


Python selection structures

if single selection structure

```
if condition:  
    expression
```

if-else double selection structure

```
if condition:  
    expression1  
else:  
    expression2
```

if-else if multiple selection structure

```
if condition:  
    expression1  
elif:  
    expression2  
else:  
    expression3
```

Python repetition structures in practice

while sentinel control

```
while condition:  
    expression
```

for counter control

```
for i in range(n):  
    expression_with_i
```

until sentinel control

```
while not condition:  
    expression
```

for counter control (Pythonic)

```
for _ in range(n):  
    expression
```

do-while sentinel control (Pythonic)

```
while True:  
    expression  
    if not condition:  
        break
```

foreach iterable control

```
for item in iterable:  
    expression
```