

More repetition: the for loop

Computer Programming 143 – Lecture 6

Program Control I

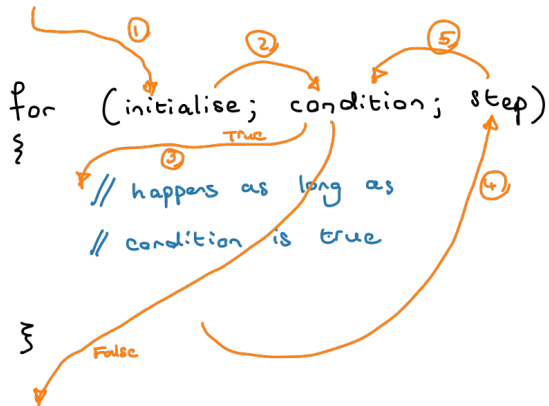
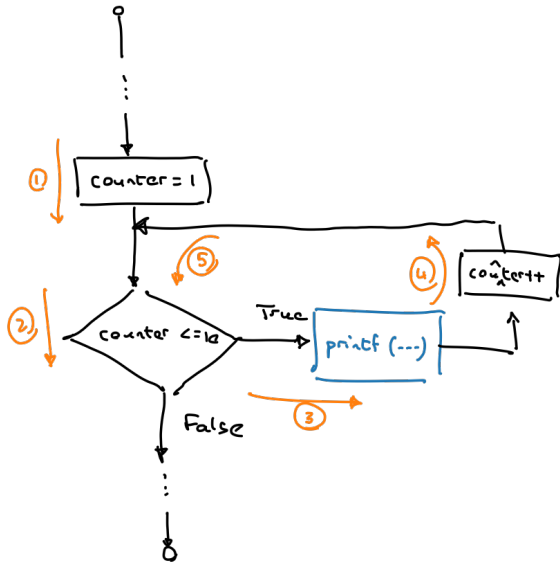
fudge $\boxed{x+2}$

$i+1$

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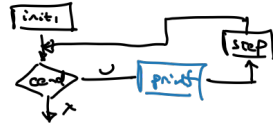


The for loop



4.4 The **for** Statement : Notes I

Memory



Initialisation and incrementation

- Can be comma-separated lists

- Example:

```
int i;
int j;

for ( initialise i = 0, j = 0; condition j+i <= 10; step j++, i++ ) {
    printf( "%d\n", j+i );
}
```

0
2
4
6
8
10

4.4 The **for** Statement : Notes II

Arithmetic expressions

- Initialisation, loop-continuation, and increment statements can contain arithmetic expressions.

```
x = 2;  
y = 10;  
for ( j = x; j <= 4*x*y; j += y/x )
```

- is equivalent to

```
for ( j = 2; j <= 80; j += 5 )
```

4.5 for Examples I

for examples

- Vary the control variable from 1 to 100 in increments of 1

```
for ( i = 1; i <= 100; i++ ) /* final value of control variable aft
```

- Vary the control variable from 100 to 1 in increments of -1

```
for ( i = 100; i >= 1; i-- ) /* final value of control variable aft
```

- Vary the control variable from 7 to 77 in increments of 7

```
for ( i = 7; i <= 77; i += 7 ) /* final value of control variable a
```

- Vary the control variable from 20 to 2 in increments of -2

```
for ( i = 20; i >= 2; i -= 2 ) /* final value of control variable a
```

4.5 for Design Example: Compound Interest I

$$a = 1000$$

$$r = 0.1$$

$$1000 + 1000 \times 0.1$$

$$\text{Year 1: } 1100$$

$$\text{Year 2: } 1210$$

$$\text{Year 3: } 1331$$

$$\vdots$$

$$\text{Year 10:}$$

for Problem statement

A person invests R1000.00 in a savings account yielding 5% interest annually. Assuming that all interest is left on deposit in the account, calculate and print the amount of money in the account at the end of each year for 10 years. Use the following formula for determining these amounts:

$$1100 + 1100 \times 0.1$$

$$1210 + 1210 \times 0.1$$

where

$$a = p(1 + r)^n,$$

p is the original amount invested (the principal)

r is the annual interest rate

n is the number of years

a is the amount on deposit at the end of the n th year

amount
1000.0

Homework

- 1 Study Sections 4.1-4.5 in Deitel & Deitel
- 2 Do Self Review Exercises 4.3, 4.4(a),(b)&(d) in Deitel & Deitel
- 3 Do Exercises 4.5(a),(d),(e)&(g), 4.7, 4.11, 4.16 in Deitel & Deitel