CONTROL FLOW STATEMENTS III

CIS122 – Structured Programming

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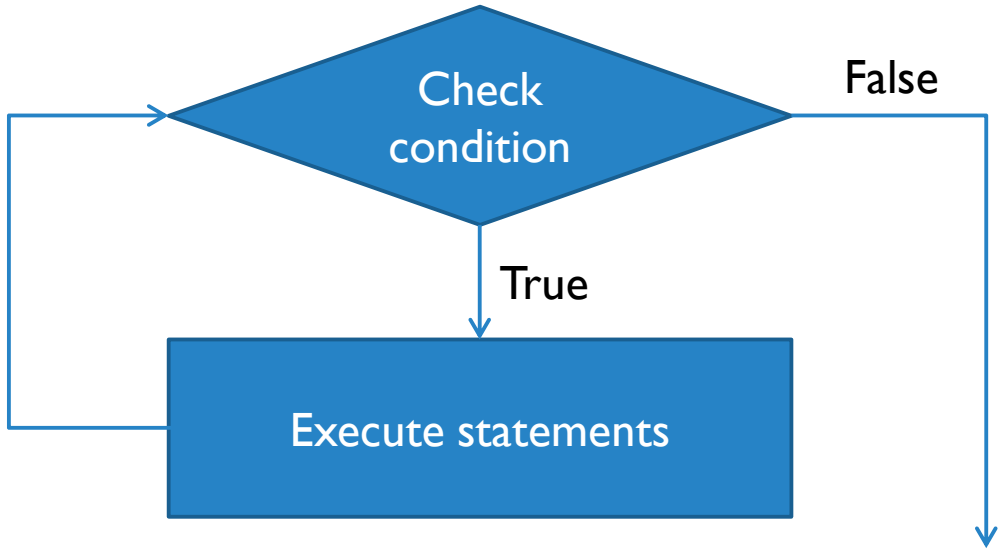
Type of Fuel

- The problem is to count the different types of fuels (alcohol, gasoline and diesel) supplied
- We take an integer input, and decide the following:
  - If the input is 1, 2 or 3, then we increase the count of alcohol, gasoline and diesel respectively
  - If the input is 4, we end the process and show the counts
  - Otherwise, we ignore the input
- Let us see a different solution approach

LOOPS: SUMMARY

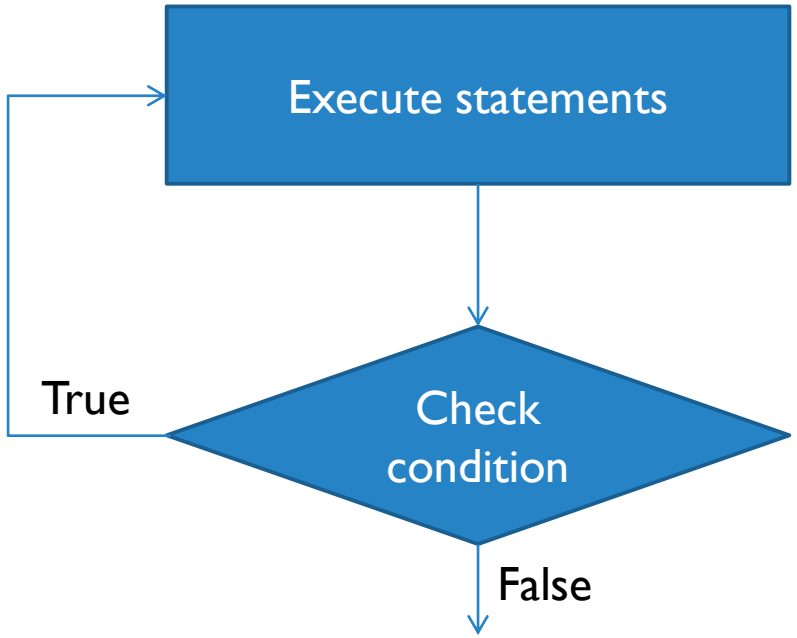
while structure and control flow

```
while(condition) {
  // statements
}
```



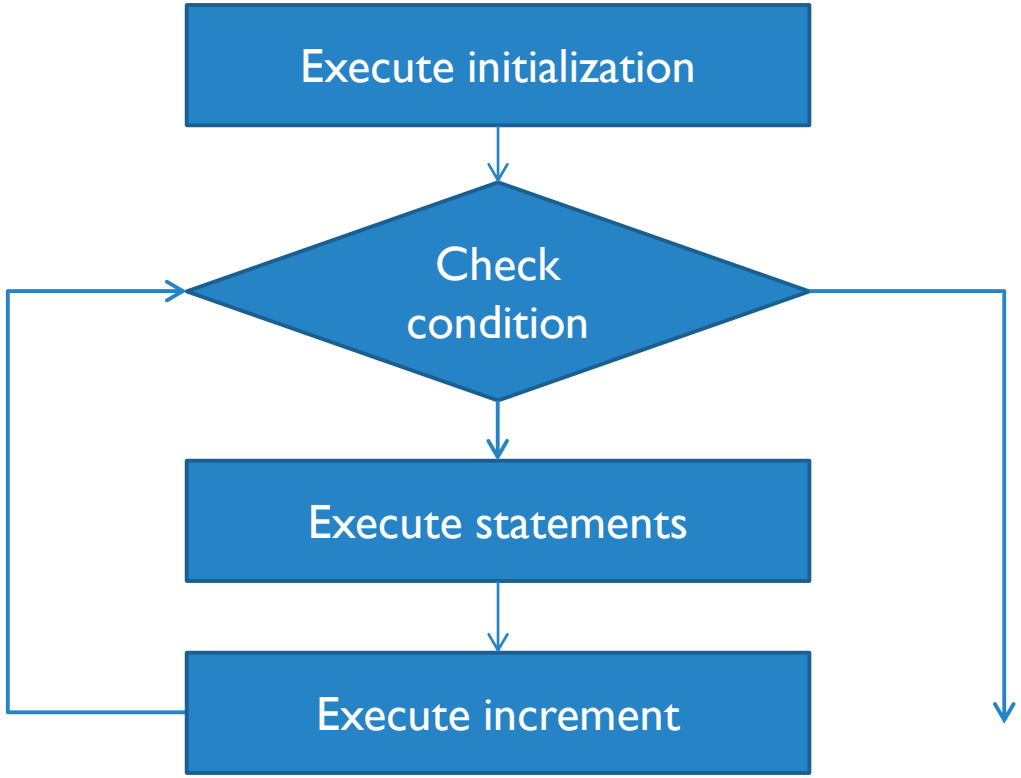
do ... while structure and control flow

```
do {
  // statements
} while(condition);
```



for structure and control flow

```
for(init; cond; inc) {
  // statements
}
init = initialization
cond = condition
inc  = increment
```



Problem: Weekday tracing

Write a C program that takes as input the weekday number, and prints the name of the day.

Example: 1 for Sunday, 2 for Monday,
… 7 for Saturday

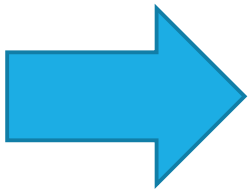
```
if(day == 1) {
    printf("Sunday\n");
} else if(day == 2) {
    printf("Monday\n");
} else if(day == 3) {
    printf("Tuesday\n");
} else if(day == 4) {
    printf("Wednesday\n");
} else if(day == 5) {
    printf("Thursday\n");
} else if(day == 6) {
    printf("Friday\n");
} else if(day == 7) {
    printf("Saturday\n");
} else {
    printf("Wrong input!!!\n");
}
```

Equality check on same variable in every if!!!

Switch … case

- Shorthand for equality check only
- Only applicable for integers and characters
- Cannot compare with another variable

```c
if(day == 1) {
    printf("Sunday\n");
} else if(day == 2) {
    printf("Monday\n");
} else if(day == 3) {
    printf("Tuesday\n");
} else if(day == 4) {
    printf("Wednesday\n");
} else if(day == 5) {
    printf("Thursday\n");
} else if(day == 6) {
    printf("Friday\n");
} else if(day == 7) {
    printf("Saturday\n");
} else {
    printf("Wrong input!!!\n");
}
```



```c
switch(day) {
case 1:
    printf("Sunday\n");
case 2:
    printf("Monday\n");
case 3:
    printf("Tuesday\n");
case 4:
    printf("Wednesday\n");
case 5:
    printf("Thursday\n");
case 6:
    printf("Friday\n");
case 7:
    printf("Saturday\n");
default:
    printf("Wrong input!!!\n");
}
```

So when I input 10, I am getting this –

```
10
Wrong input!!!

Process returned 0 (0x0)   execution time : 2.808 s
Press any key to continue.
```

And when I input 7, I am getting this –

```
7
Saturday
Wrong input!!!

Process returned 0 (0x0)   execution time : 3.359 s
Press any key to continue.
```

Just to make sure, when I input 1, …

```
1
Sunday
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday
Wrong input!!!

Process returned 0 (0x0)   execution time : 1.198 s
Press any key to continue.
```

So all the printf calls are executed after the only one we wanted to happen!!!

How do we prevent that?

```
switch(day) {
case 1:
    printf("Sunday\n");
    break;
case 2:
    printf("Monday\n");
    break;
case 3:
    printf("Tuesday\n");
    break;
case 4:
    printf("Wednesday\n");
    break;
case 5:
    printf("Thursday\n");
    break;
case 6:
    printf("Friday\n");
    break;
case 7:
    printf("Saturday\n");
    break;
default:
    printf("Wrong input!!!\n");
}
```

`switch … case` CAN ALSO OPTIMIZE `if` EXECUTION TIME

```c
if(day == 1) {
    printf("Sunday\n");
} else if(day == 2) {
    printf("Monday\n");
} else if(day == 3) {
    printf("Tuesday\n");
} else if(day == 4) {
    printf("Wednesday\n");
} else if(day == 5) {
    printf("Thursday\n");
} else if(day == 6) {
    printf("Friday\n");
} else if(day == 7) {
    printf("Saturday\n");
} else {
    printf("Wrong input!!!\n");
}
```

This code will get to the error case after checking all the if conditions

```c
switch(day) {
case 1:
    printf("Sunday\n");
    break;
case 2:
    printf("Monday\n");
    break;
case 3:
    printf("Tuesday\n");
    break;
case 4:
    printf("Wednesday\n");
    break;
case 5:
    printf("Thursday\n");
    break;
case 6:
    printf("Friday\n");
    break;
case 7:
    printf("Saturday\n");
    break;
default:
    printf("Wrong input!!!\n");
}
```

This code will get to the error case directly!!!

Problem: Simple calculator

Write a program that will add/subtract/multiply/divide two numbers according to user's choice.

```
Enter two numbers: 30 20
1. Add
2. Subtract
3. Multiply
4. Divide
Enter your choice: 3
The result is 600.000000
```