PH502: Scientific Programming Concepts

Irish Centre for High End Computing (ICHEC)

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Overview

- This lecture we will examine the other type of conditional statement, switch or case.
- If there are many code blocks that need to be chosen, at a particular point, then a switch statement is cleaner.
- There are restrictions on what is the controlling variable, it must be a character, integer or logical.
- Switch statements can be rewritten as if/then statements and it can be a matter of taste which one is used.

Switch/Case Statements

- The format of this structure is as follows:

```
switch(expression){
    case constant1:
        statement(s);
        break;
    case constant2:
        statement(s);
        break;
    default :
        statement(s);
}
```

```
select case (expression)
  case (constant1)
       statement(s)
  case (constant2)
       statement(s)
  case default
       statement(s)
end select
```

- If a condition is met in switch case then the code in that block is executed.
- If none of the statements are met then the default section is executed. This can be simply to do nothing.

Switch/Case Statements

- This example has the same logic as the previous *if* – *else* statement.

```
switch (i) {
  case 0:
    z = x + y;
    break;
  case 1:
    z = x - y;
    break;
  default:
    z = x * y;
}
```

```
select case (i)
  case (0)
    z = x + y
  case (1)
    z = x - y
  case default
    z = x * y
end select
```

- There is a difference between FORTRAN and C. Notice the break statements in the C code.
- We will discuss what break does next.

Break in Switch

C only

- The break command works in a similar way to a loop.
- When a break is reached the switch statement is exited.
- In the example below the switch is controlled by c.

```
int i; char c;
i=2; c='4';
switch (c) {
  case '0':
    i = 1;
    break;
  case '1':
  case '2':
  case '3':
    i = i + 1;
    break;
  default:
    break;
}
```

- If $c == 0$ then $i == 1$ and the other statements are skipped.
- If $c == 1, 2 or 3$ then $i = i + 1$ or is 3.

Switch/Case Fortran Example

- FORTRAN a break is assumed for each case.
- We can construct the equivalent of the C example because multiple cases are allowed.

```
integer (kind=4) :: i
character (len=1) :: c
i=2; c='4';
select case (c)
  case ('0')
    i = 1
  case ('1','2','3')
    i = i + 1
  case default
end select
```