Technical Informatics I

Control Structures (Selection) switch

by
Dr. Fatimah
Faculty of Mechanical Engineering
fatimahd@ump.edu.my

Control Structures (Selection)

- Aims
  - Introduce students to Control Structures (Selection): `switch`
- Expected Outcomes
  - Students are able to construct simple C programs that can implement selection control structures `switch`
- References
  - Harry H. Cheng, 2010. C for Engineers and Scientists: An Interpretive Approach, McGraw Hill

Content

- Selection Structures: `switch`
- Examples
- Conclusion

Control structures

- There are 3 control structures for C programs:
  1. **Sequence**
     - Each statement is executed sequentially (as seen in the previous lectures
  2. **Selection**
     - One statement is *selected* over another depending on a Selection
       - If, else if, else & switch
       - If var1 > 10, do *this*…, else do *that*…
  3. **Repetition**
     - Statements are *repeatedly* executed until it meets a certain *condition*
       - for, while, do-while loops

Switch

- A `switch` statement causes the control to jump to, into, or past a statement
- The executions inside a `switch` statement depends on the:
  - Expression value
  - `default` label
  - `case` label values
    - There is no limit of `case` values

Switch

- The **controlling expression** of a switch statement may be of type:
  - `int`
  - `string`
- The **expression** of each case label may be of type
  - `int` or `string`
  - Note that the expressions in the `switch` statements should not have the same value.
- `default` label: can only have have up to one in the switch statement

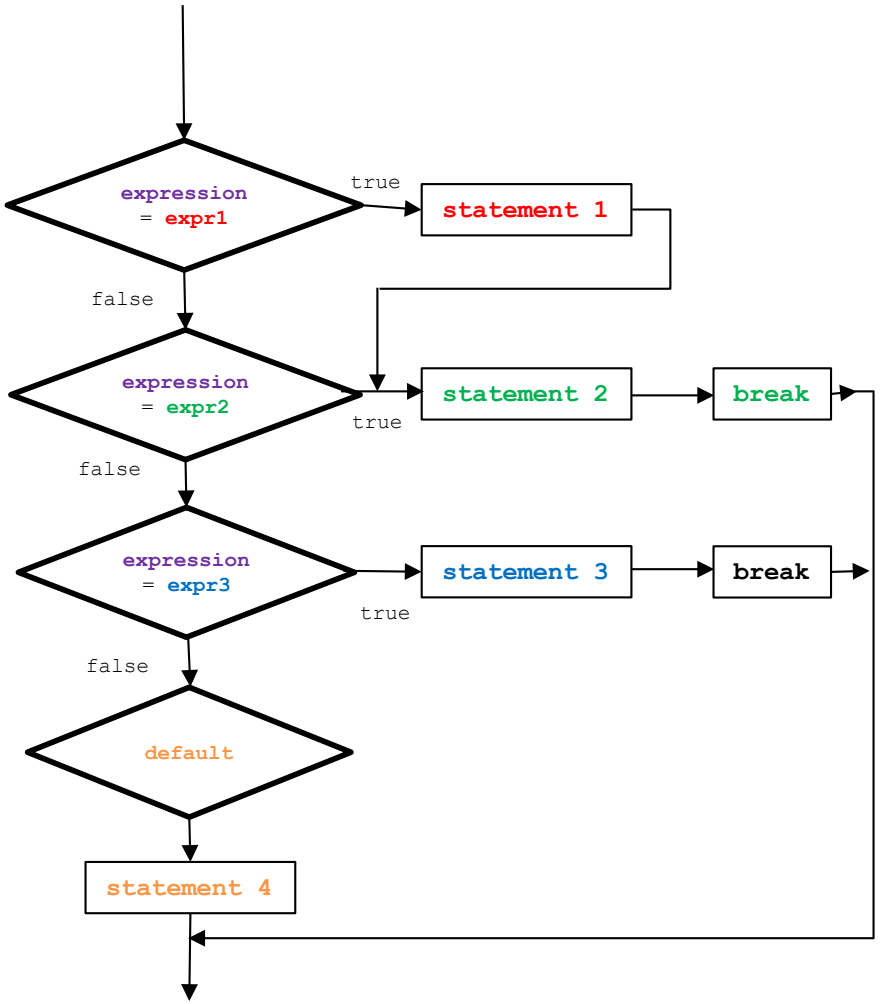
Switch

- If the **controlling expression** matches one of the case constant expressions:
  - The control jumps to the statement following the matched case label.
- If **no match occurs** and there is a `default` label:
  - control jumps to the labeled statement.
- If **no match occurs** and there is no `default` label:
  - None of the `switch` body will be executed

Flowchart for switch

The syntax of a switch statement is as follows:

```
switch(expression) {
   case expr1:
      statement1
case expr2:
      statement2
      break;
   case expr3:
      statement3
      break;
   default:
      statement 4
      break;
}
```



Examples for switch (character)

- **Example 5:**

Write a code using ‘switch’ that returns the following score given a grade input by the user:

Grade	Score
A	4.0
B	3.0
C	2.0
D	1.0
E	0.0

switch (character)

- **Example 5:**

```c
/* Example 5:control structure - switch statement*/
/* Returns a score given a grade input by the user */
#include <stdio.h>
int main() {
    char grade;      /* grade */
    double score;    /* score */
    printf("Enter a grade [A, B, C, D, F]: ");
    scanf("%c", &grade);
    switch(grade) {
        case 'A': /* entered A */
            score = 4.0;
            break;
        case 'B': /* entered B */
            score = 3.0;
            break;
        case 'C': /* entered C */
            score = 2.0;
            break;
        case 'D': /* entered D */
            score = 1.0;
            break;
        case 'F': /* entered F */
            score = 0.0;
            break;
        default: /* entered any other character */
            score = -1;
            printf("Invalid grade '%c'\n", grade);
            break;
    }
    if(score != -1)
       printf("The score for the grade '%c' is %.2f\n", grade, score);
    return 0;
}
```

```
>ch -u "L6-example5.c"
Enter a grade [A, B, C, D, F]: A
The score for the grade 'A' is 4.00
>Exit code: 0
```

```
>ch -u "L6-example5.c"
Enter a grade [A, B, C, D, F]: D
The score for the grade 'D' is 1.00
>Exit code: 0
```

```
>ch -u "L6-example5.c"
Enter a grade [A, B, C, D, F]: F
The score for the grade 'F' is 0.00
>Exit code: 0
```

```
>ch -u "L6-example5.c"
Enter a grade [A, B, C, D, F]: K
Invalid grade 'K'
>Exit code: 0
```

Examples for switch (character)

- **Example 6:**

```c
/* Example 6 */
#include <stdio.h>
int main () {
    int i;
    /*prompts for user input*/
    printf("Enter a value of i:\n");

    scanf("%d",&i);
    switch (i) {
      case 2:
      case 4:
        printf("i = 2 or 4\n");
        break;
      case 10:
        printf("i = 10\n");
        break;
      default:
        printf("i = %d\n", i);
        break;
    }
    return 0;
}
```

```
>ch -u "L6-example6.c"
Enter a value of i:
2
i = 2 or 4
>Exit code: 0
```

```
>ch -u "L6-example6.c"
Enter a value of i:
3
i = 3
>Exit code: 0
```

```
>ch -u "L6-example6.c"
Enter a value of i:
4
i = 2 or 4
>Exit code: 0
```

```
>ch -u "L6-example6.c"
Enter a value of i:
10
i = 10
>Exit code: 0
```

Technical Informatics I

Lecture 5

Dr Fatimah