

Switch

Last updated 6/19/23

These slides introduce the switch construct in C

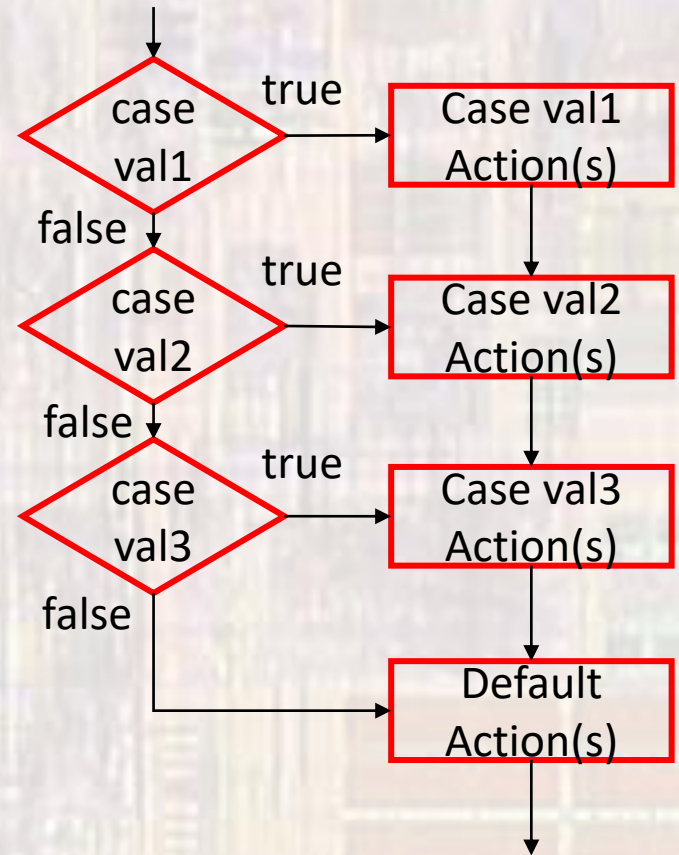
Switch

- Switch Statement
 - If... else allows a 2 way decision
 - **Switch** allows for n-way decisions
 - More restrictive on the tests

...

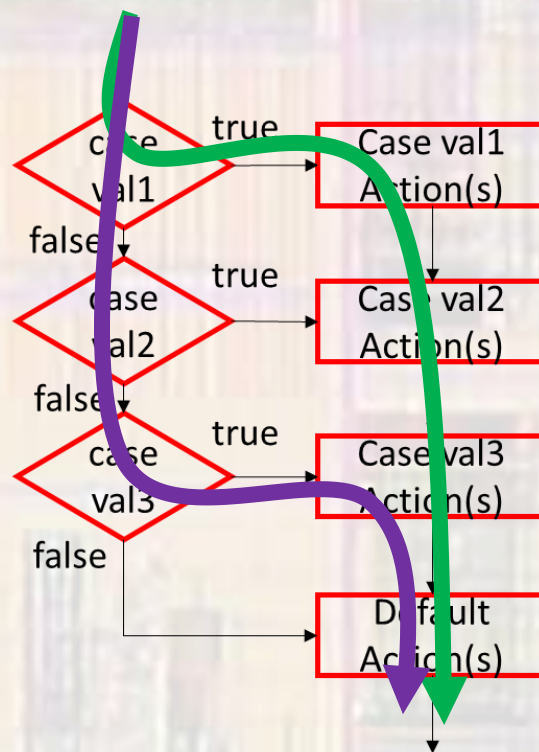
```
switch(variable){  
  case val1: statement;  
  case val2: statement;  
  case val3: statement;  
  default: statement;  
}
```

variable must be an integral value



Switch

- Nominal Path(s)
 - All actions for all cases after the true case are executed
 - Called **fall-through**



Switch

- Example
 - Launch Countdown

```
* count_down.c
*
* Created on: Jan 20, 2020
* Author: johnsontimoj
*/
// file to show case w/o breaks

#include <stdio.h>
#include <unistd.h>

int main(void){
    setbuf(stdout, NULL); // disable buffering

    int count_down;

    // get count_down
    printf("Please enter a positive integer value for count_down: ");
    scanf("%i", &count_down);
```

```
// count down
switch (count_down){
    case 5:
        printf("5\n");
        sleep(1);
    case 4:
        printf("4\n");
        sleep(1);
    case 3:
        printf("3\n");
        sleep(1);
    case 2:
        printf("2\n");
        sleep(1);
    case 1:
        printf("1\n");
        sleep(1);
    default:
        printf("blast off");
} // end switch

return 0;
} // end main
```

Switch

- Rules

```
* count_down.c
*
* Created on: Jan 20, 2020
* Author: johnsontimoj
*/
// file to show case w/o breaks

#include <stdio.h>
#include <unistd.h>

int main(void){
    setbuf(stdout, NULL); // disable buffering

    int count_down;

    // get count_down
    printf("Please enter a positive integer value for count_down: ");
    scanf("%i", &count_down);
}
```

```
// count down
switch (count_down){
    case 5:
        printf("5\n");
        sleep(1);
    case 4:
        printf("4\n");
        sleep(1);
    case 3:
        printf("3\n");
        sleep(1);
    case 2:
        printf("2\n");
        sleep(1);
    case 1:
        printf("1\n");
        sleep(1);
    default:
        printf("blast off");
} // end switch

return 0;
} // end main
```

variable to test
Cannot be an expression

Integral value

No { ... } required

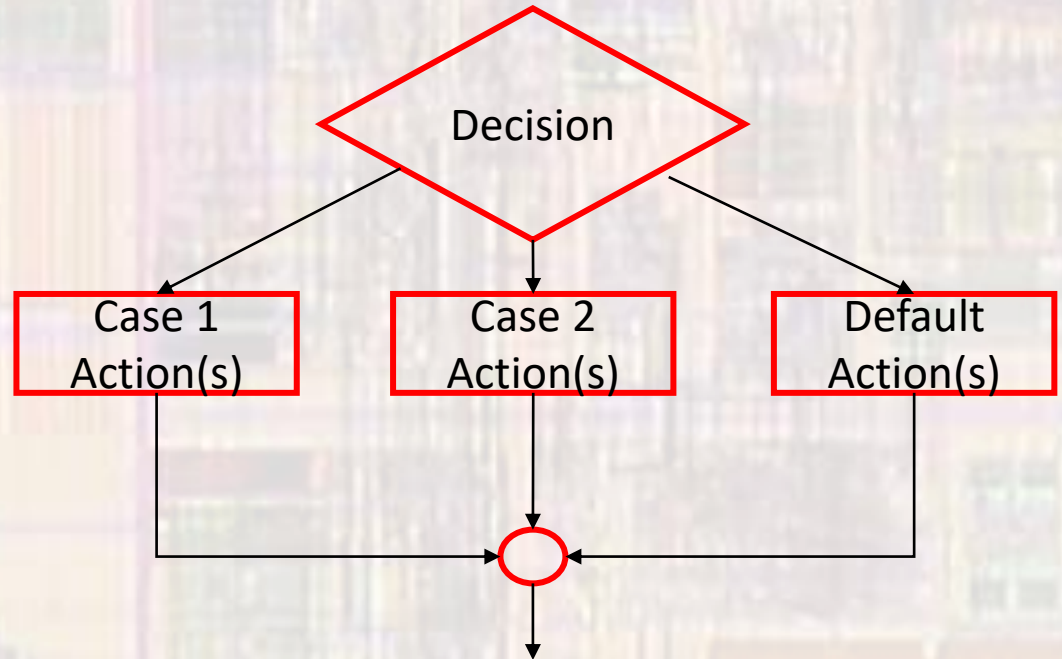
{ ... } required

Always include a default even if empty

Switch

- Switch with break
 - **break** statement: causes the current **case** to terminate and the **switch** to complete

```
switch(variable){  
  case val1:  statement;  
             statement;  
             break;  
  case val2:  statement;  
             statement;  
             break;  
  default:   statement;  
            statement;  
            break;  
}
```



Switch

- Example
- Switch with break

```
* test_grades.c
*
* Created on: Jan 20, 2020
* Author: johnsontimoi
*/
// example to show case with breaks

#include <stdio.h>

int main(void){
    setbuf(stdout, NULL); // disable buffering

    int score;

    // get test score
    printf("Please enter test score: ");
    scanf("%i", &score);

    // convert score to grade range//
    score = score / 10;
```

End switch here

```
// print grade
switch (score){
    case 10:
    case 9:
        printf("A\n");
        break;
    case 8:
        printf("B\n");
        break;
    case 7:
        printf("C\n");
        break;
    case 6:
        printf("D\n");
        break;
    default:
        printf("F\n");
        break;
} // end switch

return 0;
} // end main
```

Not necessary but
considered a best
practice

Switch

- Example
 - Mixing break and fall-through

```
/*  
 * grade_ranges.c  
 *  
 * Created on: Jan 20, 2020  
 * Author: johnsontimoi  
 */  
// file to show mixed break in case statements  
  
#include <stdio.h>  
  
int main(void){  
    setbuf(stdout, NULL); // disable buffering  
  
    char grade;  
  
    // get letter grade  
    printf("Please enter a letter grade: ");  
    scanf("%c", &grade);
```

Integral value -
No way to do
|| or &&

Trick to emulate
an OR

```
    // print grade range  
    switch (grade){  
        case 'a':  
        case 'A':{  
            printf("90 - 100\n");  
            break;  
        }  
        case 'b':  
        case 'B':{  
            printf("80 - 89\n");  
            break;  
        }  
        case 'c':  
        case 'C':{  
            printf("70 - 79\n");  
            break;  
        }  
        case 'd':  
        case 'D':{  
            printf("60 - 69\n");  
            break;  
        }  
        case 'f':  
        case 'F':{  
            printf("0 - 59\n");  
            break;  
        }  
        default:{  
            printf("Error\n");  
            break;  
        }  
    } // end switch  
  
    return 0;  
} // end main
```

{...} not required
but allowed for clarity