

Loops and conditional statements

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Ex. 1: The for loop: Using for command

```
b = 3;
for k = 1:5 % start at 1, stop at 5
    b;
end
```

Ex. 2: The for loop: Utility of the dummy index

```
b = 3;
for k = 1:5 % start at 1, stop at 5
    b^k;
end

sum1 = 0;
for k = 1:9 % start at 1, stop at 9
    sum1 = sum1 + k;
end
sum1;

sum1 = 0;
for k = 1:2:9 % start at 1, check every 2nd element, stop at 9
    sum1 = sum1 + k;
end
sum1;
```

Ex. 3: The for loop: Treatment of array within a loop

```
b = [3 8 9 4 7 5];
sum1 = 0;
for k = 1:4 % start at 1, stop at 4
    sum1 = sum1 + b(k);
end
sum1;

b = [3 8 9 4 7 5];
sum1 = 0;
for k = 1:2:5 % start at 1, check every 2nd element, stop at 5
    sum1 = sum1 + b(k);
```

```
end
sum1;
```

Ex. 4: The for loop: Double loop

```
sum1 = 0;
for n = 1:2 % start at 1, stop at 2
    for m = 1:3 % start at 1, stop at 3
        sum1 = sum1 + (n * m);
    end
end
sum1;

for n = 1:2 % start at 1, stop at 2
    for m = 1:3 % start at 1, stop at 3
        % fprintf('n = %3u m = %3u \r', n, m)
    end
end
```

Ex. 5: The for loop: Advanced example

```
b = [2 5 7 4 9 8 3];
c = [2 3 5 7];
sum1 = 0;
for k = 1:4 % start at 1, stop at 4
    sum1 = sum1 + b(c(k));
end
sum1;
```

Ex. 6: The if statement: Branching

```
num1 = 7;
if (num1 > 5)
    fprintf('%4u is greater than 5 \r', num1);
else
    fprintf('%4u is less than or equal to 5 \r', num1)
end

num1 = 3;
if (num1 > 5)
    fprintf('%4u is greater than 5 \r', num1);
else
    fprintf('%4u is less than or equal to 5 \r', num1)
end
```

Ex. 7: The if - elseif - else statement

```
num1 = 4;
if (num1 >= 5)
    fprintf('%4i is greater than or equal to 5 \r', num1)
elseif (num1 > 1)
    fprintf('%4i is less than 5 but greater than 1 \r', num1)
elseif (num1 == 1)
    fprintf('%4i equals 1 \r', num1)
```

```
elseif (num1 > -3)
    fprintf('%4i is less than 1 but greater than -3 \r', num1)
else
    fprintf('%4i is less than or equal to -3 \r', num1)
end
```

Ex. 8: An application - determine whether a given year is a leap year

```
nyear = 1975;
if (mod(nyear, 400) == 0)
    fprintf('%6u is a leap year', nyear)
elseif (mod(nyear,4) == 0) && (mod(nyear,100) ~= 0)
    fprintf('%6u is a leap year', nyear)
else
    fprintf('%6u is not a leap year', nyear)
end
```

Ex. 9: Combine looping and branching

```
sum1 = 0;
sum2 = 0;
N = 9
for k = 1:N
    sum1 = sum1 + k;
    if (mod(k,3) == 0)
        sum2 = sum2 + k;
    end
end
sum1;
sum2;
```

Ex. 10: The while loop

```
x = 3;
while (x < 100)
    x = x * 3;
end
x;
```

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