BA Discussion 10, 2020-11-06

Announcements

- today is last day to drop a class @ BU
- Exam 2 median 90.5
- Next week don't need to use gcc compiler
- this week and next, reinforcing concepts already learned in MATLAB, new material after that
- HW #4 due Monday at 9am EST
- Final project + proposal also released
- Quiz this afternoon 4:40 pm EST – 5:00pm, 15 min to complete, 5 min to upload
  - check formatting on Gradescope
  - Alternate time zone @ 7:00 am EST Saturday
- check the syllabus!

Review of Material

Header Files

- <stdio.h> ← needed for i/o
- <stdlib.h>
- <time.h>

  → needed for random number generation
- <string.h> ← needed for strings
- <math.h> ← needed for math operations

Typecasting : (type) expression

```
float number;
number = 1/5;          ← 0.0000
number = (float) 1/5;  ← 0.2000
```

Shortcuts

count++ vs. ++count

subtraction happens after, so decrement after print

```
int num = 5;
printf("The num is %d\n", num--)
 //The num is 5
printf("The num is %d\n", --num)
 // The num is 3
```

decrements before so 3 is printed

Generating Random Integers:

- need 2 header files:
  - <stdlib.h>
  - <time.h>
- need in the program to set the seed

  `srand(time(NULL));` *inside `int main(){ }`

$$\boxed{\text{general formula: } \texttt{rand() \% (MAX - MIN + 1) + MIN}}$$

ex. generate in range of 0 to N

```
rand()%(N + 1)
```

rand()%9 : 0 to 8

rand()%9 +1 : 1 to 9

ex. generate in range from 1 to N

```
rand()%N + 1
```

ex. generate in range from K to N

```
rand()%(N-K + 1) + K
```

How do we generate from 5 to 10?

→ rand()%(10-5+1)+5

→ rand()%6 +5 : 0 to 5, but then add 5

ex. generate a random float (typecast)

```
(float) rand() / N
```

Flushing input buffer:

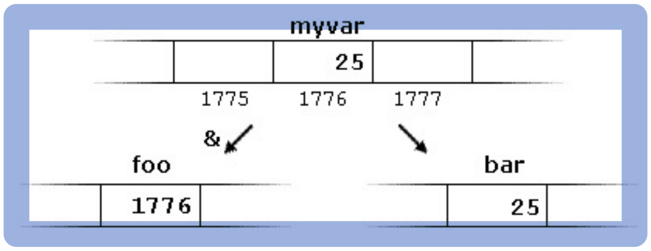
```
fflush(stdin);
```

Selection Statements

```
if (condition expression)
{
  //general statement
  // other statement
}
else
{
 //different statement
}
```

Switch Example

```
switch (variable)
{
   case 0:
   case 1:
       printf("For case 0 or case 1\n");
       break;
   case 2:
       printf("For case 2\n");
       break;
   default
       printf("The default.\n");
}
```



Referencing: remember this for later on in C material!

Loops !!!

- for loop :

```
for (i=0; i<=N; i++)
    printf("Hi!\n")
```

- Nested for loop :

```
for(i=0; i<=N; i++)
{
   //action in outer loop, including inner
   for (j=0; j<=K; j++)
   {
      //action in inner loop
   }
}
```

- While loop : action may be skipped entirely

```
while (condition example)
{
    action_1;
    action_2;
}
```

- do while loop : action on top, therefore always executed at least once!

```
do
{
   action_1;
   action_2;
}
while (condition expression);
```