C Programming

Libraries
stdio.h
math.h
string.h
stdlib.h

/ for line continuation
/*...*/ for comments

total n° units printed
n° decimals
%3.2ef exponent form e-04 = 10^{-4}

While loop

do { <statement> } while (<expression>)

do while
similar but test done at end to ensure at least 1 loop

loop until condition no longer satisfied

while (<expression>) {<statement>}

For loop

for (<st1>; <exp>; <st2>) {<statement>}

start with (e.g ii = 1)
repeat while this is true
increment loop by this (e.g ii = ii + 1)
perform statement each loop

when we know how many times to perform loop
↳ user input or hard coded, or result of equation

Files

```
FILE *fid;
fid = fopen("....txt", "...");
fclose(fid);
return(0);
```

"w" = write to file
"r" = read from
"w+" = open for read + write (overwrite)
"r+" = " (start at beginning)

fprintf
fscanf
feof ↳ check end of file not reached

f != NULL
file is ok
→ use if loop

Arrays

counting starts from 0 = n^{th} value n-1 entry

b = array2[4]
"assign variable b 4th entry of array 2"

Global variable
↳ array changed by all functions

scanf("%...", &b)
& as writing to variables not reading from

printf("%...", b)
variable name
type of variable

%lf = double
%f = float
%d = integer
%c = character

Break

Break : if criteria met then break from loop

e.g if (... == ...)
break;

Functions

define local variables for function that are wiped when function ends

```
<output type> <func.name> (<type arg1, ...) {
  <local variable allocations>;
  <statements>;
  return (<output value>);
}
```

e.g

```
double dist (double x1, double y1, double x2, double y2) {
double d;
d = sqrt ((x1-x2)*(x1-x2) + (y1-y2)*(y1-y2));
return (d);
}
```

returned variable value d stored and used in global system

Calling Function

```
double dist(double x1, double y1, double x2, double y2){
  double d;
  d=sqrt((x1-x2)*(x1-x2) + (y1-y2)*(y1-y2));
  return(d);
}
① Code starts here
int main () {
  double xa=1.0, ya=1.0;
  double xb=2.0, yb=2.0;
  double ab;
5 ab=dist(xa,ya,xb,yb);
  return(0);
}
```

③ Output taken and stored in ab
② once line 5 reached, function called on and performed independently from program
xa variable local to main program; value 'given' to x1 in function where it's locally used