CS251 Programming Languages **Handout # 13**
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Introduction to OCAML

```
# 1 + 2;;
```

```
# let a = 3 + 4;;
```

```
# a * a;;
```

```
# let dbl = fun x -> x * 2;;
```

```
# dbl 10;;
```

```
# dbl (dbl 10);;
```

```
# let triple = fun x => x * 3;;
```

```
# (fun x -> x + 1) 10;;
```

```
# let inc x = x + 1;;
```

```
# inc 10;;

# let app5 f = f 5;;

# app5 inc;;

# app5 dbl;;

# let b = a * 2;;

# let adda x = x + a;;

# adda 10;;

# let a = 42;;

# b;;

# adda 10;;

# let f n = if n > 10 then 2 * n else n * n;;

# f 20;;
```

```
# f 5;;


# let rec fact n =
    if n = 0 then
      1
    else
      n * (fact (n-1));;


# fact 5;;


# fact 12;;


# fact 13;;


# 1=1;;


# 2=3;;


# "foobar";;


# String.length "foobar";;


# String.get "foobar" 5;;


# "baz" ^ "quux" ^ (string_of_int 17);;
```

```
# (2 * 3, 4 < 5, "foo" ^ "bar", String.get "baz" 2);;


# let swap (a,b) = (b,a);;



# swap (1+2,3=4);;


# swap(swap(1+2,3=4));;


# let step (a,b) = (a + b, a*b);;



# step (1,2);;



# step (step (1,2));;


# let (a,b) = step (step (1,2)) in a+b;;


# let rec stepuntil ((a,b),limit) =
    if a >= limit then
      (a,b)
    else
      stepuntil(step(a,b),limit);;
```

```
# stepuntil ((1,2), 100);;
```

```
# let print_pair (a,b) =
    print_string ("(" ^ (string_of_int a) ^ ","
                  ^ (string_of_int b) ^ ")\n");;
```

```
# let rec stepuntil ((a,b),limit) =
   if a >= limit then
     (a,b)
   else
    (print_pair (a,b);
     stepuntil(step(a,b),limit));;
```

```
# stepuntil ((1,2),100);;
```

```
# let sumDivisors n =
    if n <= 0 then
      0
    else
      let rec sum d =
        if d == 0 then
          0
        else if (n mod d) == 0 then
          d + sum (d-1)
        else
          sum (d-1)
      in sum (n-1);;
```

```
# sumDivisors 12;;
```

```
# let numDivisors n =
    if n <= 0 then
      0
    else
      let rec sum d =
        if d == 0 then
          0
        else if (n mod d) == 0 then
          1 + sum (d-1)
        else
          sum (d-1)
      in sum (n-1);;



# numDivisors 12;;



# let numAndSumDivisors n =
    if n <= 0 then
     (0,0)
    else
      let rec sum d =
        if d == 0 then
          (0,0)
        else if (n mod d) == 0 then
          let (n,s) = sum (d-1)
            in (1+n,d+s)
        else
          sum (d-1)
      in sum (n-1)



# numAndSumDivisors 12;;
```

```
# let avg1 (a,b) = (a+b)/2;;
```

```
# avg1 (10,20);;
```

```
# let avg2 a b = (a+b)/2;;
```

```
# avg2 10 20;;
```

```
# app5 (avg2 15);;
```