

# Computer Science & Engineering 150A

## Problem Solving Using Computers – Laboratory

### Lecture 05 - Functions

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# Announcement: CodeLab assignment

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Function

- The 2nd CodeLab assignment

"CodeLab Assignment-2"

Due: 23:59 Feb 22

Three steps to design your own function:

- Prototype — Declaration
- Definition — Implementation
- Call — Usage

```
#include <stdio.h>
```

```
void PrintAlarm(void);
```

```
int Cube(int x);
```

```
double EllipseArea(int x, int y);
```

```
int main(void)
```

```
{ ...
```

- Between preprocessor directive and main function
- Return type – void, int, double, char, etc
- Argument – void, single, multiple
- ";"

# Function: Definition

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Function

```
ReturnType FuncName(type Arg 1,...)
{
    local variable declarations;
    executable statements;
    return statement;
}
```

- After the main function
- $\approx$  prototype, without ";"
- "{", "}" – scope
- Local variables disappear outside scope
- Output
  - Return statement
  - Match returntype

# Function: Function prototype and definition

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preprocessor directive

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Function

```
ReturnType funcname(InputType arg1, ...);\\prototype
```

```
int main(void)
```

```
{
```

```
...
```

```
funcname(value1, ...);\\call the function
```

```
...
```

```
}
```

```
ReturnType funcname(InputType arg1, ...)\\definition
```

```
{
```

```
    Implementation Codes ...
```

```
}
```

# Function: Example 1

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Function

```
#include <stdio.h>
```

```
double GetArea(double length, double width);
```

```
int main(void)
```

```
{
```

```
double x = 8.5, y = 12.4, area;
```

```
area = GetArea(x, y);
```

```
printf("The area of rectangle is %f", area);
```

```
}
```

```
double GetArea(double length, double width)
```

```
{
```

```
return (length*width);
```

```
}
```

```
#include <stdio.h>

void PrintAlarm(void);

int main(void)
{
    PrintAlarm();
}

void PrintAlarm( void )
{
    printf("The message you input is wrong");
}
```



# Function: Example 3

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Function

```
#include <stdio.h>

int Cube(int x);

int main(void)
{
    int x = 4, y ;
    y = Cube(x) ;
}

int Cube(int x)
{
    int y;
    y = x * x * x ;
    return y;
}
```

## Function: Example 4

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Function

```
#include <stdio.h>

double EllipseArea(int x, int y);

int main(void)
{
    int x = 4, y = 5, z;
    z = EllipseArea(x, y);
}

double EllipseArea(int x, int y)
{
    return 3.14159 * x * y ;
}
```