# Unit 03 assessment: Seeing how it works

1. Select one of the engineering case examples as the source of information for your functional analysis, and answer the following questions. In each case, you will use answers to the questions “What does it do?” to identify basic functions and “What has to happen in order that the basic functions can be completed?” to identify the secondary function.  
     
   Before you begin, please remember the difference between a basic or secondary function and an application. Basic or secondary functions are what a device or system does as it inputs and outputs information, energy, and materials with the surroundings. Applications are what the end user will do with the device. A washing machine inputs clean water and electrical energy and outputs dirty water (functions), which helps it to clean your clothes (the application).  
     
   **Case 3a: Design of a 3D printer pen/3D printer**

* What are 3 basic functions of the product or system? (3 points)
  + Accepts existing conventional 3D printer feedstock (raw plastic material)
  + Allows user to move the pen, control feed rate and digitally control temperature
  + Returns melted plastic material through a nozzle
* What is 1 secondary function of the product or system? (1 point)
  + Consumes electrical energy to power the heater and control of the material feed rate/temperature
* Identify the secondary function as either required or unwanted. (1 point)
  + Required

1. For the benefit of the people grading the course, please repeat the problem statement you wrote for the Unit 02 assessment. We won’t be grading it this time … we just want to know what your project is all about.

* What is the problem statement that you wrote for the Unit 02 assessment for your idea for a new product/system or an improvement to an existing product or system?

A design for a toaster is required that will allow for easy crust removal and spread application. The additional system would be used in the kitchen setting, operate on demand, and function simply and safely for the general public to use and maintain. The system must still allow for 4 slices of bread and operate at temperatures of up to 300 °C safely and without wear.

Answer the following questions for this product or system.

* What are 3 basic functions of the product or system? (3 points)
  + Accepts sliced bread and spreads from the user
  + Allows user to select spread options, crust removal, and degree of toasting
  + Returns toast with spread and crust as per user’s input
* What is 1 secondary function of the product or system? (1 point)
  + Consumes electrical energy to power the heater, crust knife, and spread applicator
* Identify the secondary function as either required or unwanted. (1 point)
  + Required