# DEPARTMENT OF ROBOTICS & MECHATRONICS ENGINEERING
# UNIVERSITY OF DHAKA

Course code : RME 3212
Course name : Manufacturing Process with CNC Programming Lab

Experiment no : 03
Experiment name : CNC turning operation.

Group no : 06
Group members: 1. Rabeya Akter  (SK-092-015)
                2. Tahmid Yusuf (FH-092-019)
                3. Safaeid Hossain Arib (FH-092-020)
                4. Ujan Samaddar (SH-092-045)

Prepared by: Name: Safaeid Hossain Arib
              Roll no: FH-092-020
Submitted to: Dr. Shamim Ahmed Deowan
             Assistant Professor
             Department of Robotics & Mechatronics Engineering
             University of Dhaka

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## Objective:
- Learn CNC turning operation
- Learn to operate CNC machine

## Theory:
CNC milling is a machine process which produces custom-designed parts or components by progressively removing material from the workpiece using rotating multi-point cutting tools and computerized controls. These systems usually have three linear degrees of freedom. They can move freely around the X, Y, and Z axes while the workpiece remains stationary. This limited dimensional operation reduces the speed of operations, making milling more suitable for prototyping and smaller production runs.

CNC turning is a manufacturing process that involves holding bars of material in a chuck and rotating them while feeding a tool to the piece to remove material until the desired shape is achieved. As the desired shape is achieved through the removal of material, it is also known as subtraction machining.All of the work can be completed from one side if the CNC turning center has only one turret, but some turning centers have a main spindle and sub-spindle for even faster operation. With this configuration, the main spindle partially machines the workpiece, which is then moved to the sub-spindle to complete the job on the other side of the part. The speed of CNC turning operations makes it an ideal process for large production runs with short lead times.

The production capabilities of CNC milling include a range of processes, such as:
- Chemical
- Electrical
- Mechanical
- Thermal

CNC mills provide superior material conservation efficiency, which leads to a reduction in material costs over the machine's lifespan. CNC mills fabricate products such as complex short-run production parts, precision components and parts, and prototype parts.

CNC turning lathes, on the other hand, are used to conduct operations such as:
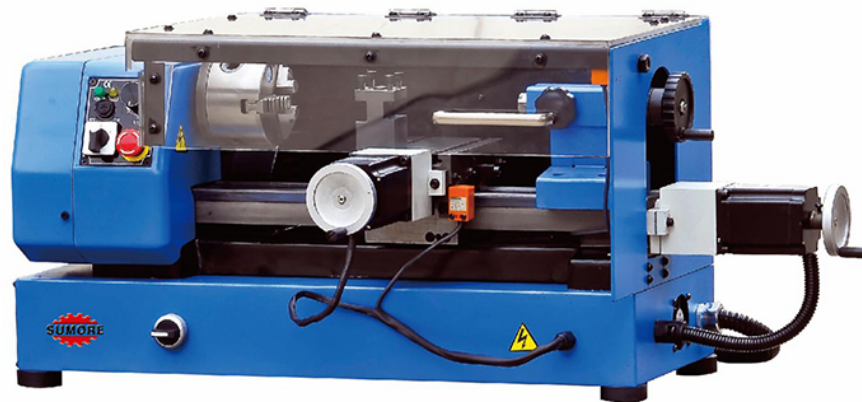- Drilling
- Facing
- Grooving
- Knurling
- Parting

CNC milling and turning are used in a number of industries, including:
- Wood working
- Electrical industry
- Electrical discharge machine (EDM)
- Metal removing
- Material fabrication

## Equipment:
- CNC lathe machine

- Wood piece

## Procedure:
- First we fix the wood piece to the CNC lathe machine and turn on the machine.
- Then we code to get our desired shape.
- After completing the code, we see the simulation if it's doing the turning operation correctly.
- As the correct turning operation is done in the simulation, we do the operation in real with the lathe machine.
- The CNC lathe machine does the turning operation and we get our desired shape.

## Code:
```
N10 M03 S2000;
N20 G94 G00 X-8 Z2;
N30 G01 X-15.5 F50;
N40 Z-38 F50;
N50 G00 X-8 Z0;
N60 G01 X-18 F50;
N70 Z-18 F50;
N80 G00 X-8 Z2;
N90 M30;
```

**Result:**
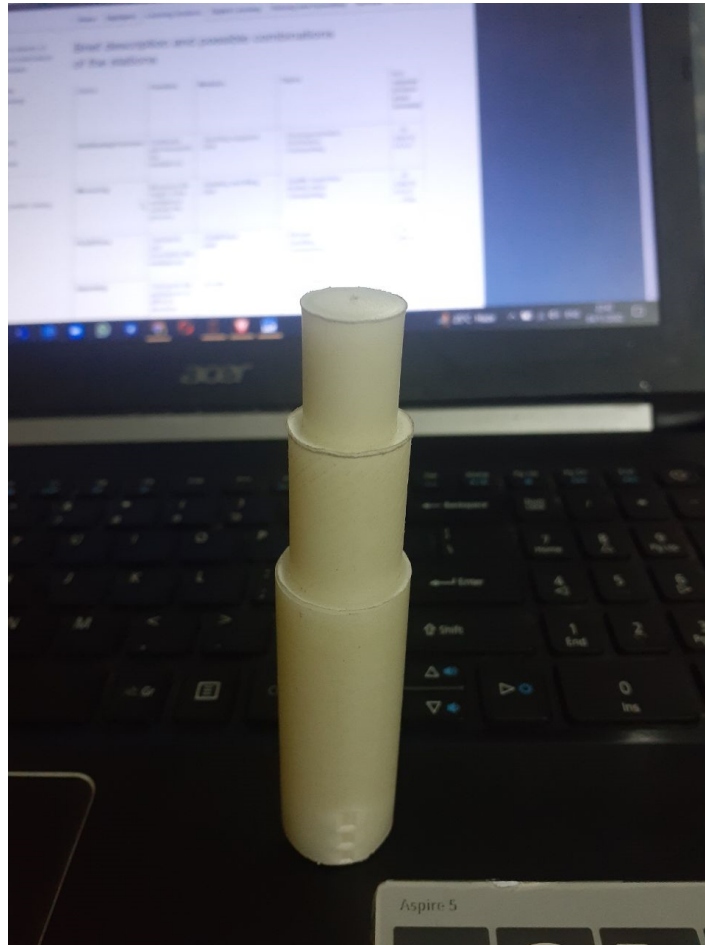


**Discussion:**
We got our expected shape. Initially, we struggled to find the machine zero and workpiece zero, but finally we could figure that out and fix our code properly. Even though we took a long time, the code got our expected shape and we could do the turning operation properly.
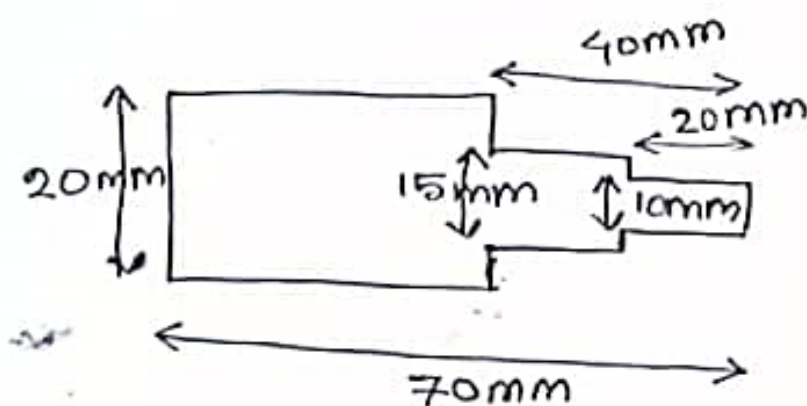
**Reference:**
- https://www.technoxmachine.com/blog/what-basics-cnc-milling-turning/#:~:text=CNC%20turning%20is%20a%20manufacturing,also%20known%20as%20subtraction%20machining.

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Group members –

Sd/-
21.07.2022

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2) Tahmid Yusuf (FH-092-019)
3) Sarfaeid Hossain Anib (FH-092-020)
4) Ujan Samaddar (SH-092-045)