# National 4/5 <br> Graphic Communication Theory 

## TOPIC 2: 2D Computer Aided Design (CAD) 3D Computer Modelling Commands, Techniques and Practices.

## 2D Computer Aided Design (CAD) Commands, Techniques and Practices.

Drafting Commands:

Line Arc
Rectangle


Ellipse

drawing

Polygon (used shapes with different numbers of sides


Fillet

Layout commands:
Layers:

Layers
CAD software enables drawings to be built up in a series of layers. Different drawing features are allocated to separate layers e.g. dimensions, construction lines, text and outlines. Layers are like clear film overlays that can be switched on or off to control the parts of a drawing to be viewed.

Layers provide several benefits:


- Drawings can be built up in stages and are easier to manage.
- Several versions can be printed, each with different layers visible.
- Printing selected layers makes the drawing easier to understand.
- Careful selection of layers allows printed information appropriate to the user, giving architects and engineers greater control over what tradespeople and clients will see.

The floor plan below shows a drawing for a new kitchen extension. All the layers are visible and consequently the floor plan is cluttered and difficult to understand.


## CAD Library:

## CAD library

A CAD library of standard parts or components enables the user to store pre-drawn icons for use on any number of drawings. These icons are often pre-installed as part of the CAD application but can be drawn in-house and updated as designs change. The CAD library saves time and effort by enabling the architect or engineer to select icons from a palette or menu and drop them into composite drawings.

For example, the kitchen extension design shown here makes use of several standard library components:


## Editing Commands

2D COMPUTER-AIDED DESIGN

Other CAD commands In addition to layers and libraries, there are many other CAD commands you should familiarise yourself with. This poge describes the most important ones.


Change units selects the units of measurement used within the drawing.


Line types selects BSI line types used in CAD drawings.


Pattern fill inserts a range of line patterns to specified areas within objects.


Arc/Box/Circle draws arcs, boxes and circles quickly and accurately.


Copy duplicates objects without having to redraw them each time.


Mirror creales a mirror image copy of an object about a specified axis.



Auto-dimensioning Auto-dimensioning
automatically calculates and odds dimensions to BSI standards.


Distort/Rubber banding allows you to pull/stretch one end of an object or line.


Move selects objects and repositions them on the drowing.


creates multiple copies of objects in rectangular or objects in rectangular or circular arrangements.


Grid displays an onscreen grid of specified spacing to allow accurate drawing.


Orthe restricts lines to vertical or horizontal directions only.


Tangent connects circles and lines ot tangents, quickly and accurately.
from the middle of a line. Extend mokes a line longer.


Grid lock/Snap attoches the end points of lines to the grid/specified snop spacing.


Pan moves the on-screen view without zooming in or out.


Undo reverses the last command to restore the drowing to its previous state.


Chamfer and fillet create angled (chamfered) and rounded (filleted) corners.


Group combines separde objects together so that they are handled as one.


Part erasing/Trim removes parts of objects specified by the user.


Zoom enlarges the onscreen view to allow small detoils to be easily seen.

## 3D Computer Modelling Commands, Techniques and Practices.

Modelling Techniques

Revolution

Extrusion

Modelling Edits, shell, subtraction, union, fillet, chamfer



Fillet


Subtraction


Chamfer


Addition

Use the Union command to ensure that both parts of the solid are one object


Homework 2 Questions

## Question 1

The following drawings are the result of applying 5 2D CAD commands

## State the name of the command used in each case

1. 


3.

5.


## Question 2

Drawings of a van are shown opposite. State the single CAD command that would be used to create the following details.
a) The straight edge shown at $A$
b) The rounded corner shown at B $\qquad$
c) The curved surface shown at C $\qquad$
d) The angled corner shown at D $\qquad$
e) The circumference of the circle shown at $D$ $\qquad$

f) The writing shown at $\qquad$
g) The gap in the line $X$ shown at $G$ $\qquad$
h) The Identical wheel shown at H $\qquad$
i) The identical features shown around the wheel shown at J $\qquad$


Wheel (H)


Enlarged Wheel J
j) The enlarged wheel shown at J $\qquad$

An exploded isometric view of the trophy, you have modelled is shown below. Name the 3D modelling or editing command that produced the different features
a) The square base at $\mathbf{A}$ before the hole and sloping edges were added
$\qquad$
b) The slot in the medal shown at $\mathbf{B}$.
$\qquad$
c) The rounded corner shown at $\mathbf{C}$
d) The angle corner shown at D
$\qquad$
e) The command used to ensure that both the red cuboids are one part, shown at $\mathbf{E}$.

$\qquad$

## Question 4

What 2 changes would need to made to change view 1 into view 2

Change 1 $\qquad$ Change 2 $\qquad$

## View 1



## View 2

