10

TVL Industrial Arts:

Electrical Installation and Maintenance (EIM) NCII

Quarter 2 – Module 8:

Methods of Wiring Installation (Part 2)

(Week 8)

DepED
DEPARTMENT OF EDUCATION

What I Need to Know

This module contains information and suggested learning activities on the installation of wiring devices using different conduit. It includes instructions on how to install Electrical Metallic Tubing (EMT), Polyvinyl chloride (PVC), Rigid Metal Conduit (RMC), Flexible Metallic Tubing (FMT), and Intermediate Metallic Tubing (IMT).

At the end of this module the students will be able to:

1. understand the methods of installation using different conduit;
2. interpret plan/drawing based on the job requirement;
3. draw an electrical wiring diagram; and
4. install a wiring diagram based on the task given.

What I Know

Name: _____ Grade and Section: _____ Quarter: ___
Module Number: _____ Lesson Title: _____

A. Multiple Choice. Choose the letter of your answer and write it on a separate sheet of paper.

1. It is the size of conduit which can accommodate a maximum of 10 wires AWG # 12.
   A. 3/8 B. 1/2 C. 3/4 D. 1 ¼
2. It is a type of fitting which is used to secure EMT to metallic boxes.
   A. Connector B. condulets C. adaptor D. coupling
3. A pipe or raceway which serves as passage of electrical conductors.
   A. Concealed wiring C. Surface wiring
   B. Conduit D. Circuit
4. A type of wiring installation which is designed to lessen or eliminate fire hazard and electrical accidents.
   A. Rigid metallic conduit C. Electrical wiring
   B. Conduit D. Safety installation
5. The electrical wiring system inside wall, roof, or floor with the help of plastic or metallic piping.
   A. Surface wiring C. Concealed wiring
   B. Grounding D. Open wiring

6.The following are the use of flexible non-metallic conduit which are permitted, **EXCEPT** one.

A. For direct burial where listed and marked for the purpose.

B. For outdoor locations where listed and marked as suitable for the purpose.

C. Where protection of the contained conductors is required from vapors, liquids, or solids

D. Where voltage of the contained conductors is more than 600 volts

7.The minimum electrical trade sizes of liquid tight flexible nonmetallic conduit

A. 10mm(15mm) B. 15mm(20mm) C. 20mm(25mm) D. 25mm(30mm)

8.How many numbers of conductors used in ½-inch trade size conduit?

A. 8 B. 9 C. 10 D. 11

9. Most are made of galvanized steel but can also be aluminum. It is also called "thin-wall" conduit because it is thin and lightweight.

A.EMT conduit B. EMT coupling C. EMT connector D. EMT strap

10. The color of the wire used in grounding.

A. blue B. red C. black D. green

11. The minimum trade size of flexible metallic conduit

A. 1/4 B. 1/2 C. 1/8 D. 3/4

12. A standard length of electrical metallic tubing that follows the gas pipe

A. 10 ft. B. 11 ft. C. 12 ft. D. 13 ft.

13. It is the fitting used for joining flexible metal conduits.

A. Metal strap B. connector C. box D. fittings

14. It is a tool used to bend conduit pipes in different curves and angles.

A. Pipe cutter C. Pipe bender

B. Pipe reamer D. Pipe threader

15. GFCI receptacle outlets serving the countertop shall be located above the countertop, but not more than _____ above the countertop.

A. 15 inches B. 18 inches C. 20 inches D. 25 inches

What is It

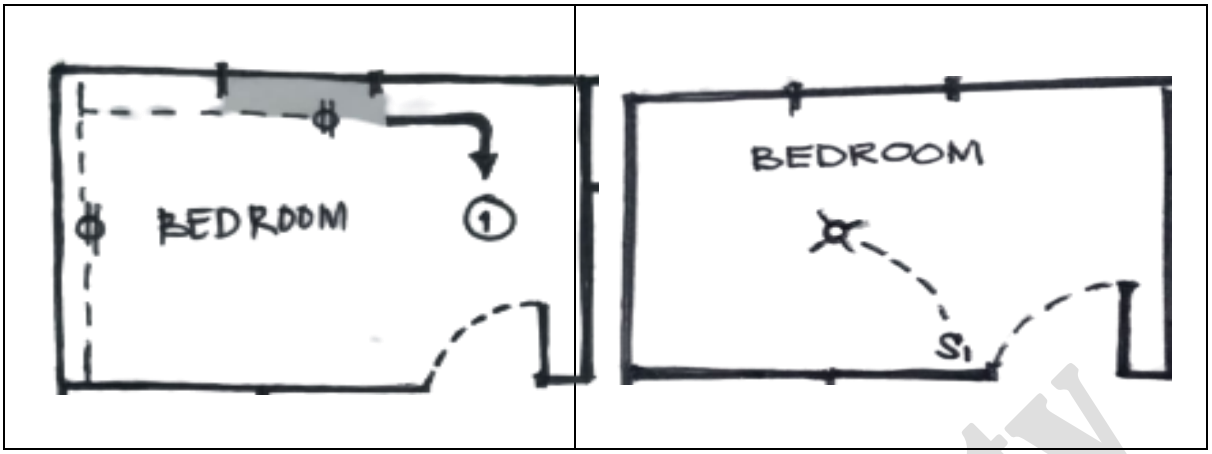
Example illustration

Instructions: Use colored pens or a pencil to draw the diagram.

Legend:

Blue or Orange----Non-metallic conduit

Gray or Pencil-----Metallic conduit



Power Lay-out ***Lighting Lay-out***

Materials

Power lay-out: use polyvinyl chloride conduit (PVC)

- Utility box ------ 2pcs.
- Convenience outlet --- 2pcs

Lighting lay-out: use flexible metallic conduit (FMC)

- Utility box ------- 1pc.
- Single pole switch ----- 1pc.
- Octagonal box ----------1pc.
- Bulb socket ---------- 1pc.
- Bulb ---------- 1pc.

Diagram

Schematic Diagram

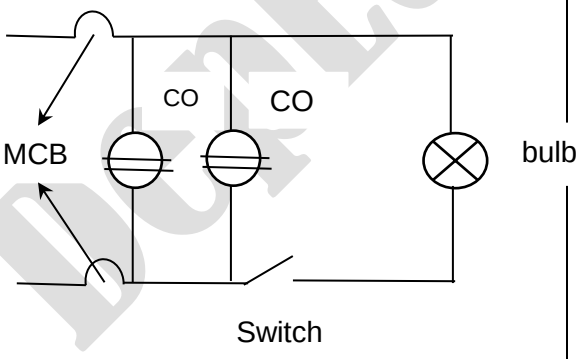


Figure A

Line Diagram

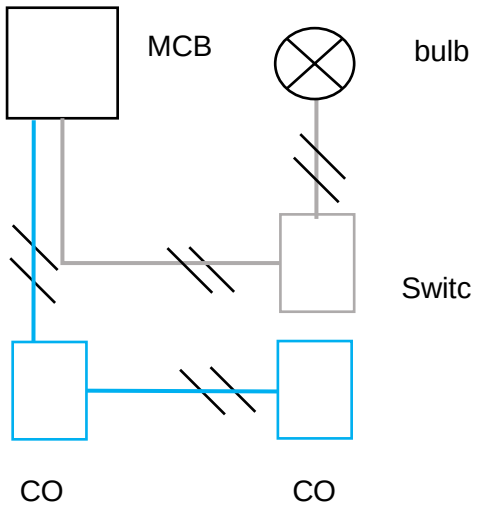


Figure B

Pictorial Diagram

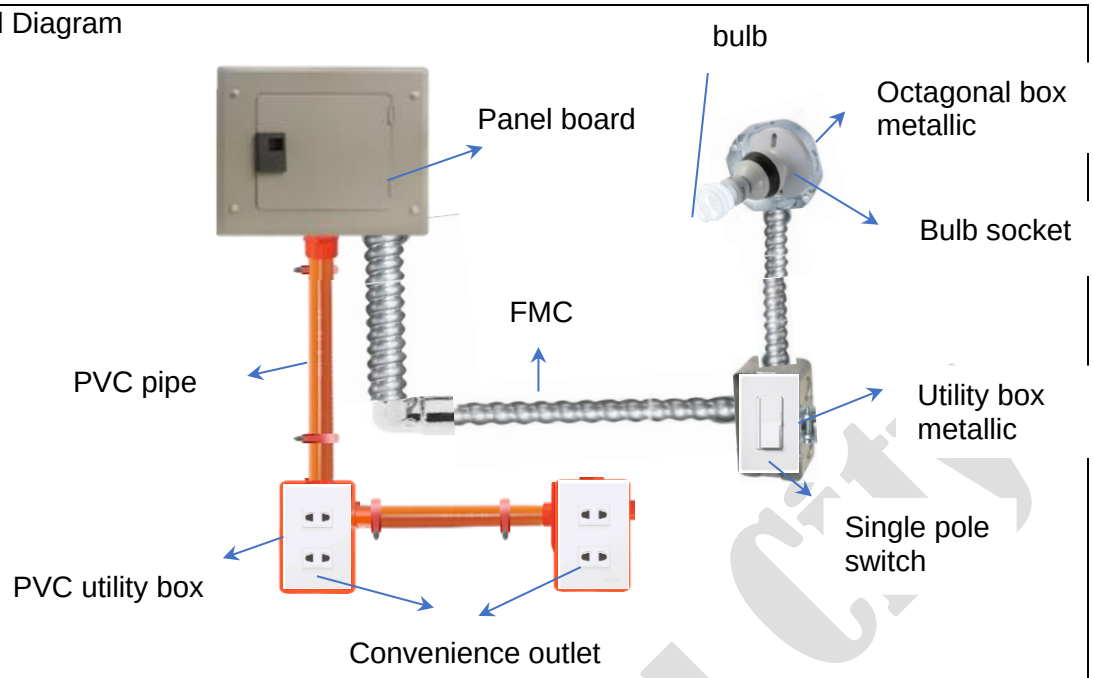


Figure C

Actual Wiring Diagram

Legend:

Black-hot

Red-neutral

Green- ground

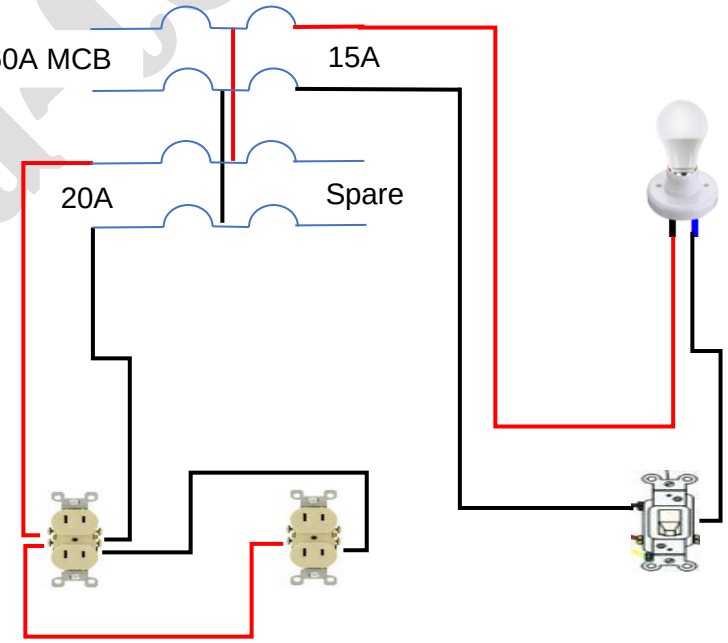


Figure D

What's More

Name: _____ Grade and Section: _____ Quarter: ___
Module Number: _____ Lesson Title: _____

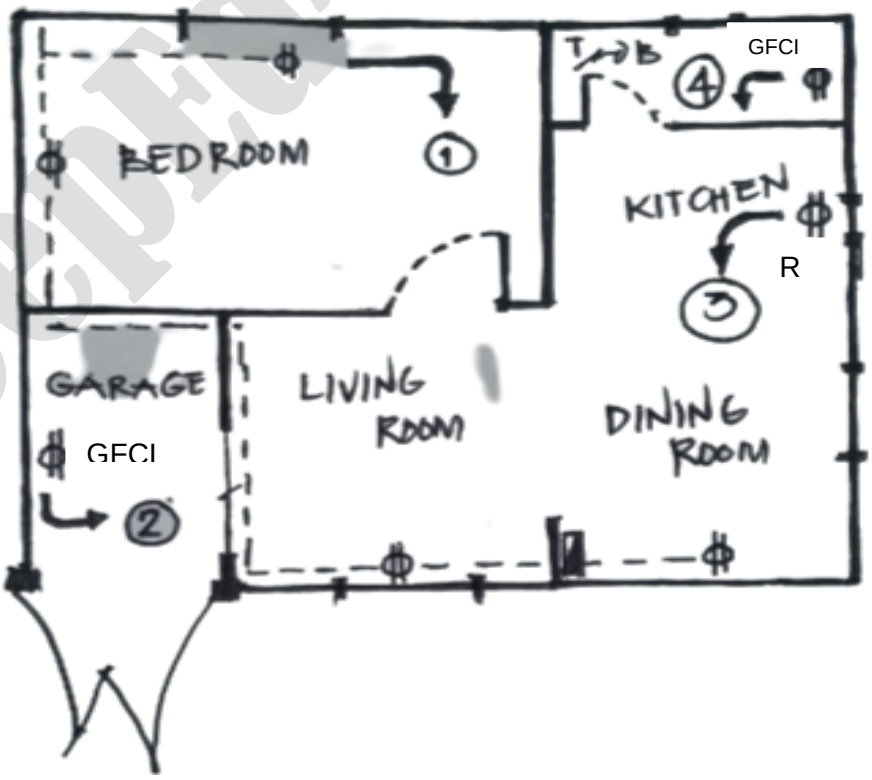
Instructions: Given an illustration of Power Layout of electrical plan. Use all the materials listed below, not more nor less and create your own design for making a ***schematic diagram*** in figure A, ***pictorial diagram*** in figure B, ***line diagram in figure*** C and the ***actual wiring diagram*** in figure D. Use a eparate sheet of bond paper for your answer. You may check the answers using the Answer Key at the end of the module.

Legend: (Use colored pen or pencil to draw the diagram.)
For line diagram and pictorial diagram use the following:

Blue or Orange----Non-metallic conduit (T and B, Garage)
Gray or Pencil-----Metallic conduit (Bedroom, Living, Dining and Kitchen)

For actual wiring diagram use the following:

Black--Hot
Red--- Neutral
Green- Ground



A. List of materials

Bedroom 1. Utility box (metal) - 2pcs. 2. Convenience outlet (2 gang) - 2pcs.	Dining room and Kitchen 1. Utility box (metal) - 2pcs. 2. Range outlet (3 prong) -1pc. 3. Convenience outlet (2 gang) - 1pc
Garage, T and B 1. Utility box (PVC) - 2pcs 2. GFCI outlet - 2pcs.	Living room 1. Utility box - 1pc. 2. Convenience outlet (2 gang) - 1pc

B. Diagram

Schematic Diagram Figure A	Line Diagram Figure C
Pictorial Diagram Figure C	Actual Wiring Diagram Figure D

What I Have Learned

Name: _____ Grade and Section: _____ Quarter: ___
Module Number: _____ Lesson Title: _____

Answer the question below.

1. What do colored wires mean in electrical?

_____

_____

_____

Assessment

A. Multiple Choice. Choose the letter of your answer and write it on a separate sheet of paper.

1. It is the size of conduit which can accommodate a maximum of 10 wires AWG # 12.
   A. 1/2 B. 3/4 C. 1 D. 1 ¼
2. It is a type of fitting which is used to secure EMT to metallic boxes.
   A. Coupling B. condulets C. adaptor D. connector
3. The electrical wiring system inside the wall, roof, or floor with the help of plastic or metallic piping.
   A. Surface wiring C. Concealed wiring
   B. Grounding D. Open wiring
4. A pipe or raceway which serves as passage of electrical conductors.
   A. Circuit C. Concealed wiring
   B. Surface wiring D. Conduit
5. The minimum electrical trade sizes of liquid tight flexible nonmetallic conduit.
   A. 10mm(15mm) B. 15mm(20mm) C. 20mm(25mm) D. 25mm(30mm)
6. A type of wiring installation which is designed to lessen or eliminate fire hazard and electrical accidents.
   A. Rigid metallic conduit C. Electrical wiring
   B. Conduit D. Safety installation
7. The color of the wire used in grounding.
   A. blue B. red C. black D. green

8. The following are the use of flexible non-metallic conduit which are permitted, **EXCEPT** one.
   A. For direct burial where listed and marked for the purpose.
   B. For outdoor locations where listed and marked as suitable for the purpose.
   C. Where voltage of the contained conductors is more than 600 volts
   D. Where protection of the contained conductors is required from vapors, liquids, or solids
9. How many numbers of conductors used in ½-inch trade size conduit?
   A. 11 B. 10 C. 9 D. 8
10. Most are made of galvanized steel but can also be aluminum. It is also called "thin-wall" conduit because it is thin and lightweight.
   A. EMT coupling B. EMT conduit C. EMT connector D. EMT strap
11. A standard length of electrical metallic tubing that follows the gas pipe
   A. 10 ft. B. 11 ft. C. 12 ft. D. 13 ft.
12. The minimum trade size of flexible metallic conduit
   A. 1/4 B. 1/2 C. 1/8 D. 3/4
13. It is the fitting used for joining flexible metal conduits.
   A. Metal strap B. connector C. box D. fittings
14. GFCI receptacle outlets serving the countertop shall be located above the countertop, but not more than _____ above the countertop.
   A. 15 inches B. 18 inches C. 20 inches D. 25 inches
15. It is a tool used to bend conduit pipes in different curves and angles.
   A. Pipe cutter C. Pipe bender
   B. Pipe reamer D. Pipe threader

Additional Activities

Name: _____ Grade and Section: _____ Quarter: ___
Module Number: ____ Lesson Title: _____

Instructions: Given an illustration of Lighting Layout of electrical plan. List all materials to be used for the installation and create your own design for making a ***schematic diagram*** in figure A, ***line diagram*** in figure B, ***pictorial diagram in figure*** C and the ***actual wiring diagram*** in figure D. Use another sheet of bond paper for your answer.

Legend: (Use colored pen or pencil to draw the diagram.)

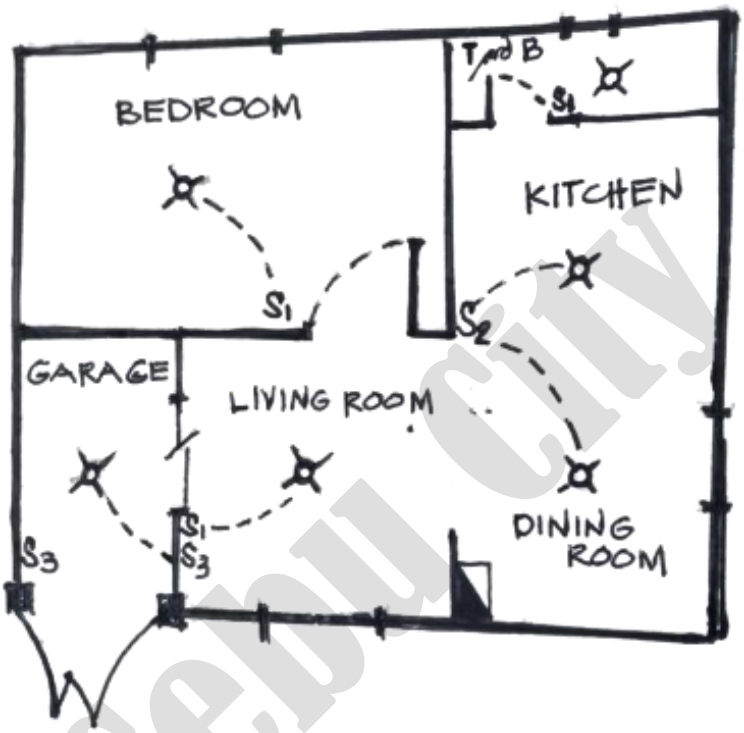
For line diagram and pictorial diagram, use the following:

Blue or Orange----Non-metallic conduit (Living room, Garage)
Gray or Pencil-----Metallic conduit (T&B, Bedroom, Dining and Kitchen)

For actual wiring diagram, use the following:

Black--Hot
Red--- Neutral
Green- Ground

Lighting layout

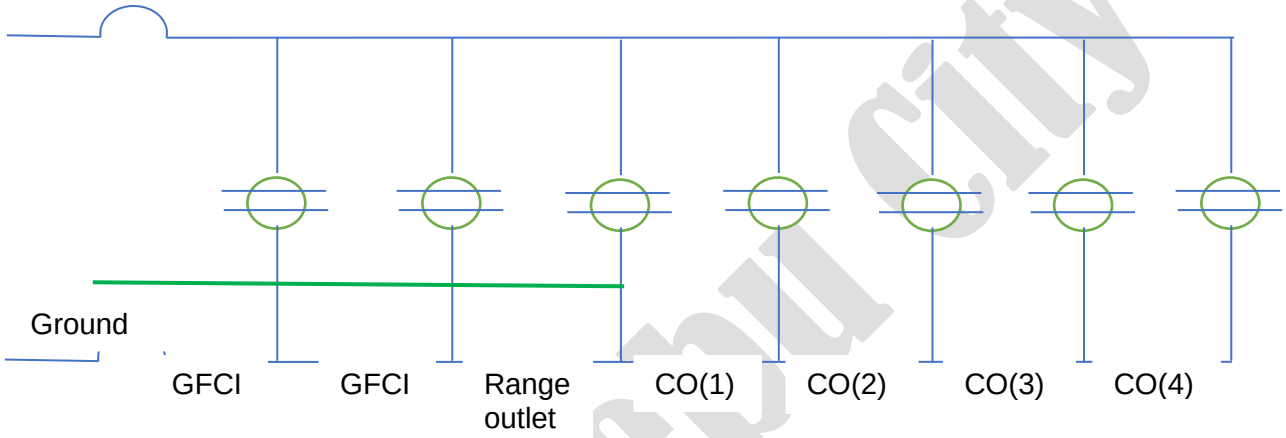


Schematic Diagram Figure A	Line Diagram Figure B
Pictorial Diagram Figure C	Actual Wiring Diagram Figure D

Answer Key

What's More

Schematic Diagram (Figure A)



Line Diagram (Figure B)

Legend:

GFCI (1)-Garage

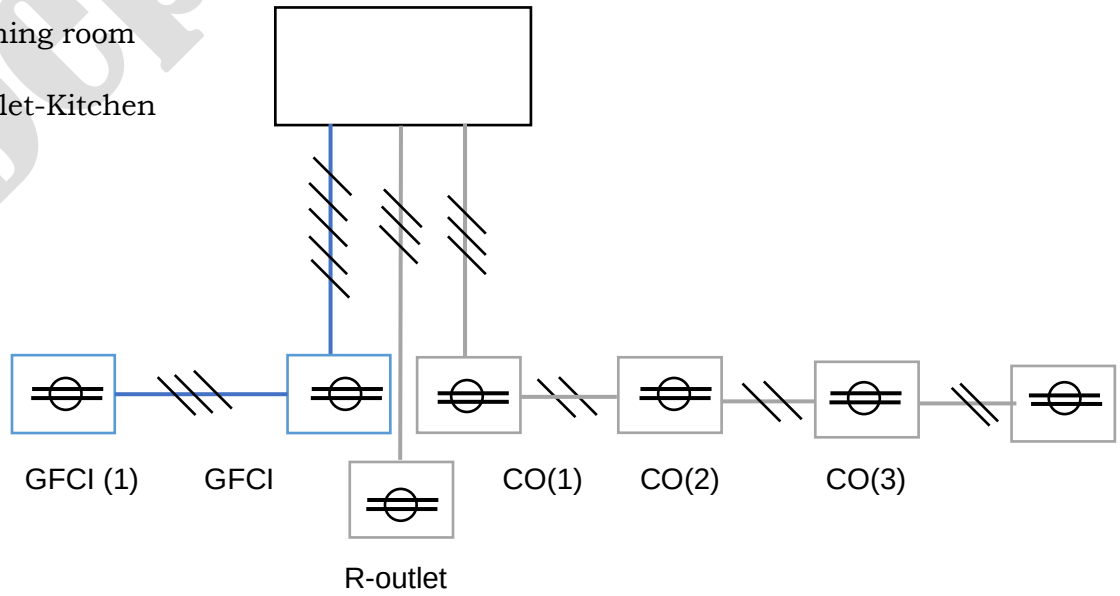
GFCI (2)-T and B

CO (1&2)-Bedroom

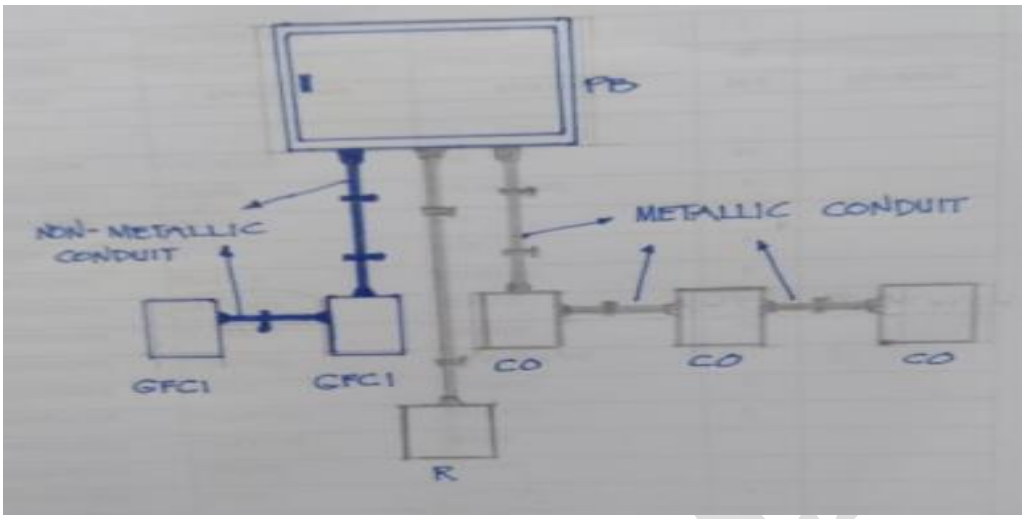
CO (2)-Living room

CO (3)-Dining room

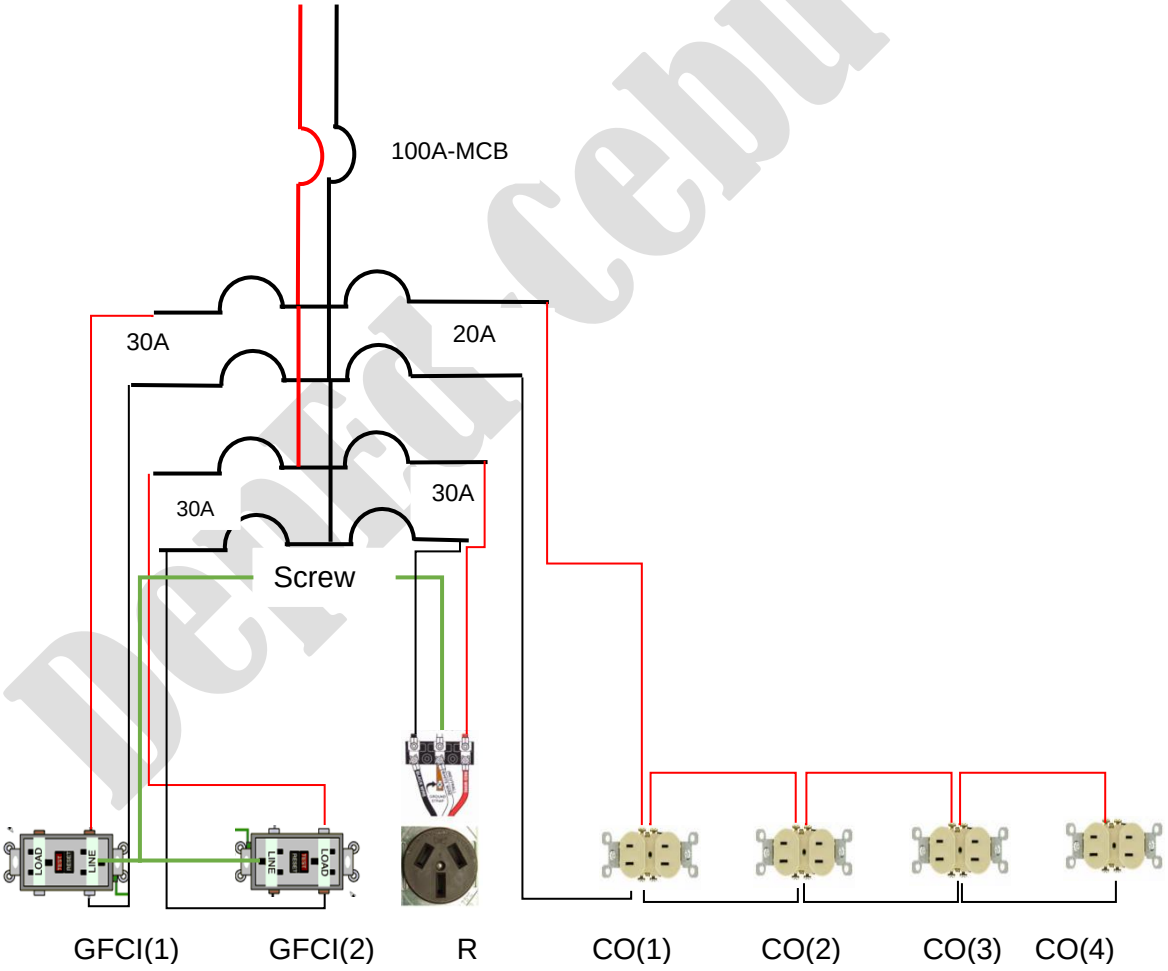
R- outlet-Kitchen



Pictorial Diagram (Figure C)



Actual Wiring Diagram (Figure D)



What I Have Learned

1. What do the colored wires mean in electrical?

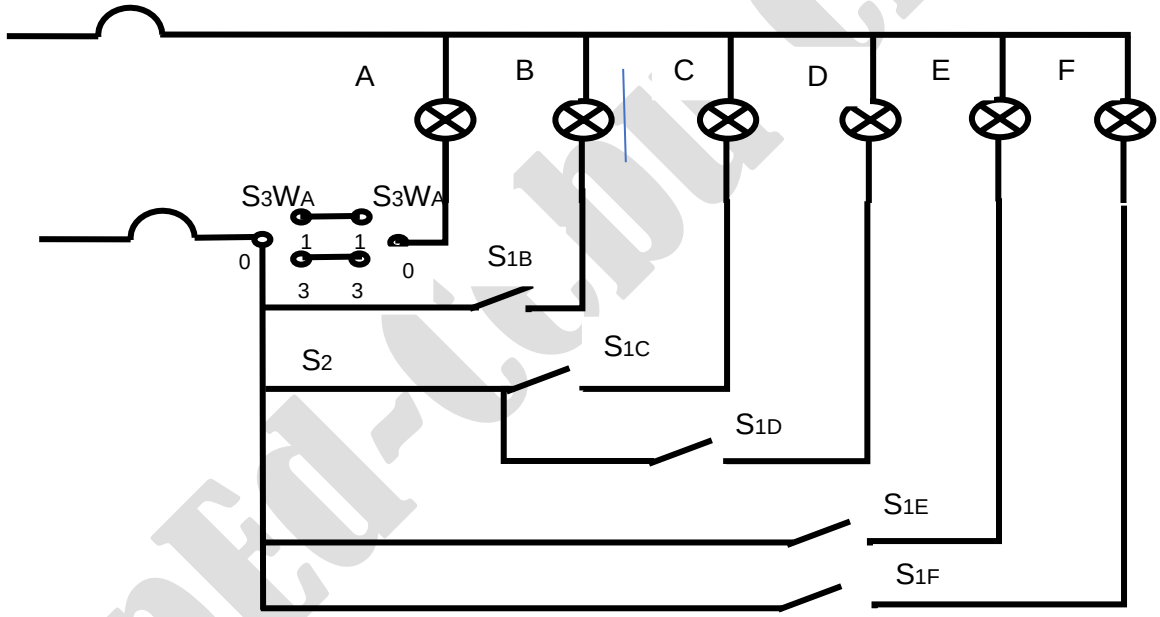
Answer: The protective ground is green or green with **yellow** stripe. The neutral is white, the hot (live or active) single phase **wires are** black, and red in the case of a second active. Three-phase lines **are** red, black, and **blue**.

Additional Activities

Schematic Diagram (Figure A)

Legend:

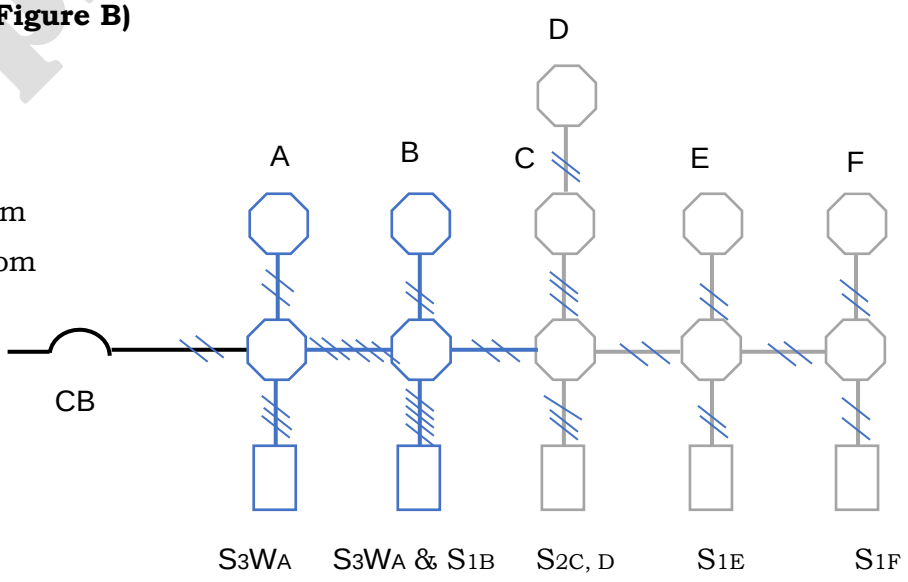
A- Garage D- Kitchen
B- Living room E- Bedroom
C- Dining room F- T&B



Line Diagram (Figure B)

Legend:

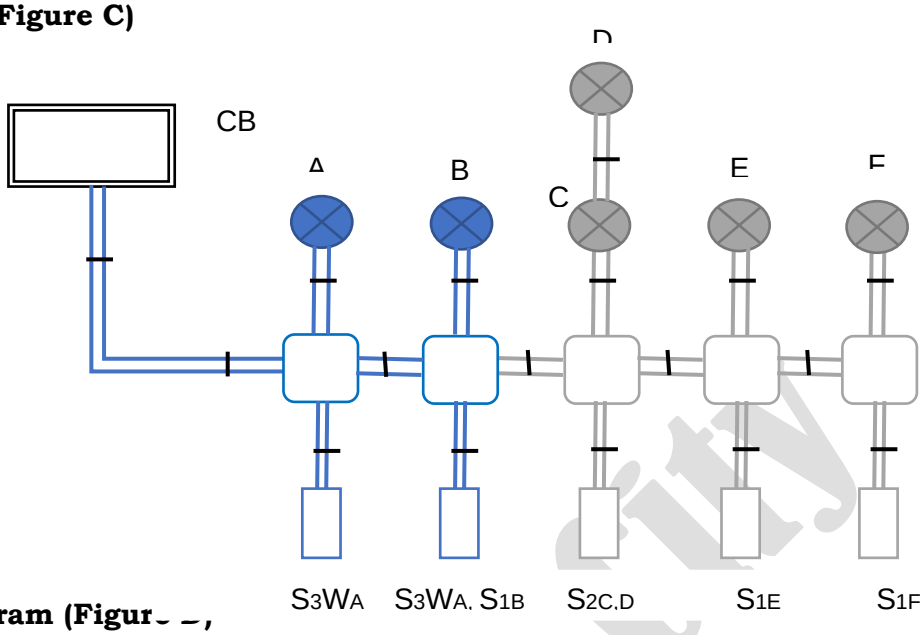
A- Garage
B- Living room
C- Dining room
D- Kitchen
E- Bedroom
F- F- T&B



Pictorial Diagram (Figure C)

Legend:

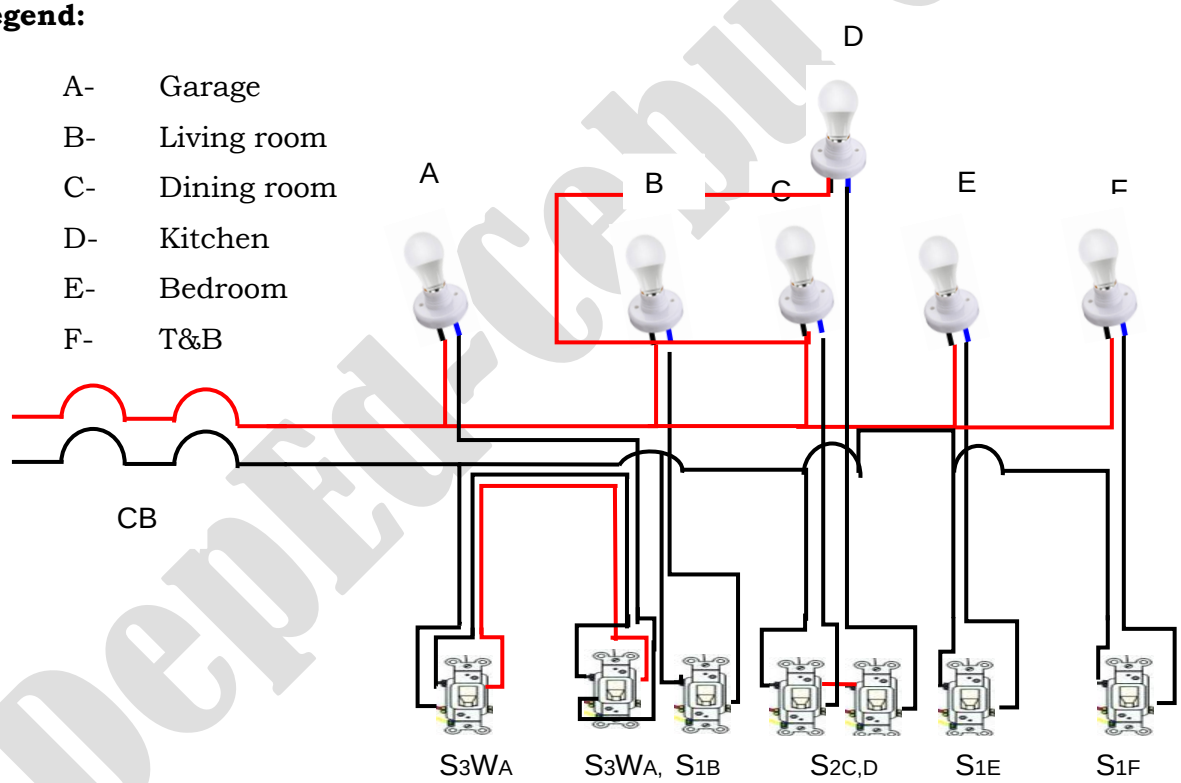
A- Garage
B- Living room
C- Dining room
D- Kitchen
E- Bedroom
F- T&B



Actual Wiring Diagram (Figur_ _,

Legend:

A- Garage
B- Living room
C- Dining room
D- Kitchen
E- Bedroom
F- T&B



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