Task 1: Fill in the blanks

Choose the correct word from the box given below and fill in the blanks with the appropriate answers. Please note that **one word can be used more than once.**

ethernet	**another**	**wireless adapter**	**radio**	**network**	**IP addresses**
switch	**wireless**	**cables**	**router**	**share**	**hardware**

1. A Network is a group of connected computers and devices.
2. Networks help devices share information.
3. Devices connected with wires use an ethernet connection.
4. A switch helps direct data to the correct device in the same network.
5. A router connects different networks together.
6. Digital devices connect to a network using an ethernet cable.
7. Routers and switches are examples of network hardware.
8. A wired connection is often faster and more stable.
9. Devices connected using Wi-Fi are using wireless networks.
10. Wi-Fi uses radio waves to send and receive data.
11. A wireless adapter connects a computer to a wireless network.
12. Routers can work with both wired and wireless devices.
13. Switches only work within the same network.
14. Network hardware helps data travel from one place to another.
15. Wireless networks do not need physical cables.
16. A router assigns IP addresses to devices on the network.

Task 2: Network Hardware – Q & A

1. From the sentences below, mark a TICK against the **two** sentences which are **true** about networks:

- [x] A network is a group of computers and devices that can share information.
- [ ] Switches connect different networks together across long distances.
- [x] Networks help devices talk to each other and share data.
- [ ] Wi-Fi connections use wires to send signals between computers.
- [ ] A router is only used to connect printers to computers.

2. What is a **network**? Briefly describe what a network does.

A network is a group of devices connected together to share data and resources. It helps devices communicate and share information, such as messages, files, and internet access.

3. Name the **two** devices which are used to connect devices across a network.

switch

router

4. After reading the following six statements, write **wired** after the statements you identify as characteristics of wired networks and the word **wireless** in front of the statements you identify as characteristics of wireless networks.

Statement	Wired/ Wireless
a. Data usually travels faster and is more stable in this type of network.	wired
b. Devices connect without cables, using signals in the air.	wireless
c. This type of network is often easier to set up in large open spaces.	wireless
d. You need physical cables to connect devices in this kind of network.	wired
e. It can be harder to move devices around because they are tied to cables.	wired
f. Signals can be affected by walls or distance from the router.	wireless

5. **Briefly explain how the following devices work:**

a. **Switch**

A switch connects devices on the same network and sends data to the correct device.

b. **Router**

A router connects different networks and chooses the best path for data to travel.

6. What is the benefit of using a **wireless access point (WAP)**?

A WAP allows devices to connect to a network wirelessly using Wi-Fi, without needing cables.

7. Give **three** examples of devices that can connect to the internet wirelessly:

a. smart phone b. tablet c. laptop

8. What kind of signals does **a Wi-Fi network** use to transmit data?

Wi-Fi uses radio waves to transmit data.

9. Can a router work with both **wired and wireless** devices?

A router can connect wired devices using Ethernet cables and wireless devices using Wi-Fi.

10. Do you think **wired** connections are better than **wireless** connections? Explain why or why not.

Wired connections can be better when speed and stability are important, because they are usually faster and less affected by interference. Wireless connections are more convenient because devices can move around freely.

11. Look at the pictures below and fill in the Names of the devices, Connection Type and Purpose

		
Name	switch	router
Connection Type	wired	wireless
Purpose	connect multiple devices in a local area netwrok and send data to correct device	connected devices to the internet and allow communication between wired and wireless devices

Task 3: Wired or Wireless Network?

Carefully read each **scenario** and identify whether it describes a **wired** or **wireless** network.

	Scenarios	Wired/ Wireless
1	At the bank, the computers that tellers use to check accounts and transfer money are connected to the internet using cables for extra security.	wired
2	In the university library, students use their laptops to do research by connecting to the campus Wi-Fi.	wireless
3	Doctors and nurses use tablets to check patient information. These tablets connect to the hospital's secure Wi-Fi network.	wireless
4	The police station's security system is connected to the internet using strong cables to ensure it always works properly	wired
5	Saad's gaming console at home connects to the internet using an Ethernet cable for faster gaming speed.	wired
6	Employees use laptops to attend video meetings. Their laptops are connected to the internet through Wi-Fi so they can move around easily.	wireless
7	In a coffee shop, a customer pays using a card machine that connects to the internet through Wi-Fi.	wireless
8	At the airport, passengers use their laptops to check emails using free public Wi-Fi.	wireless

Task 5: Fill in the Blanks

Choose the correct words from the box given below and fill in the boxes with the appropriate answers. **A word may be used more than once**:

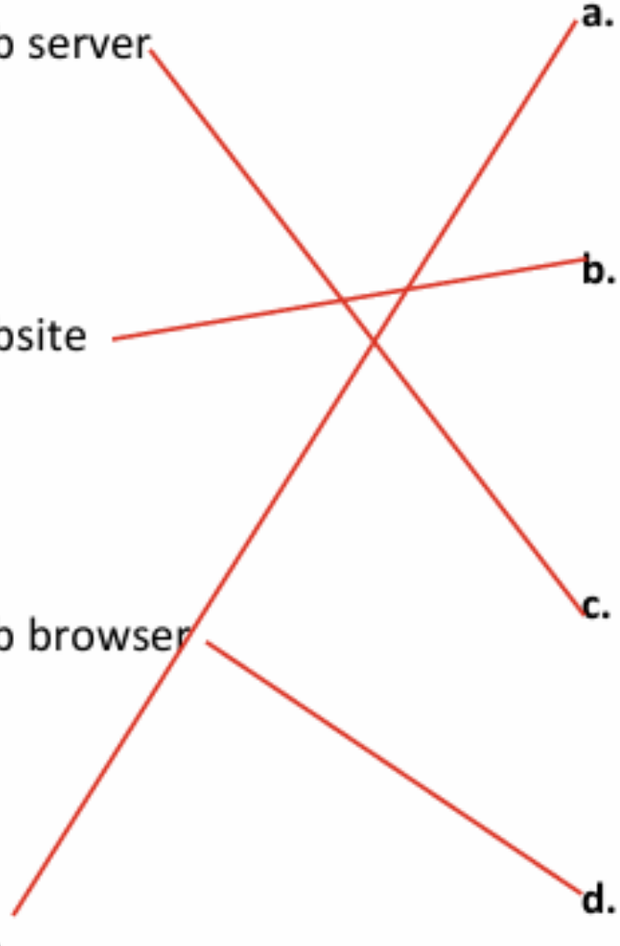
router	**wireless**	**weak**	**networks**	**packets**
cellular	**radio waves**	**transmit**	**interference**	**devices**
source	**megabits per second (MBPs) / gigabits per second (GBPs)**		**switch**	**wired**

1. Data travels in the form of _____packets_____.
2. Devices like switches and routers help to _____transmit_____ data.
3. Data can travel through cables or _____wireless_____ signals.
4. Connection speed is measured in _____MBPs/ GBPs_____.
5. The network mobile phones connect to a network with is called a _____cellular_____ network.
6. The biggest disadvantage of cellular networks is that they can suffer from _____interference_____.
7. Interference can either stop a device from connecting or make the connection _____weak_____.
8. A _____switches_____ connects devices using wires inside a local network.
9. Routers connect multiple _____network_____ together.
10. A _____router_____ decides the best path for the data.
11. Each packet has a _____source_____ and a destination address.
12. Networks allow data to travel between different _____device_____.
13. A _____wired_____ connection uses cables.
14. Wi-Fi uses _____radio waves_____ to send data.
15. Data is broken up into _____packets_____ before transmission to improve efficiency.
16. Wireless networks use _____radio waves_____ to transmit data.

Task 6: Who am I?

The following 5 terms are related to networks. Match each term with the correct description:

Term	Description
1. Web server	**a.** I am the address you type in the search bar to visit a page on the Internet.
2. Website	**b.** I am a place on the Internet where information, pictures, and videos are stored and shown together on a page or set of pages.
3. Web browser	**c.** I am a computer that stores websites and sends them to your device when you ask for them.
4. URL	**d.** I am the program you use to open and look at websites, like Chrome or Safari.



Task 7: Q & A (Part 1)

1. Read the following statements about Cellular Networks. Only **two** statements are **true**. Mark a tick (✓)

- [x] Cellular networks use towers to send and receive data.
- [ ] Cellular networks always need Wi-Fi to work.
- [x] Cellular networks let phones and tablets connect to the internet using mobile signals.
- [ ] Cellular networks only work when you are at home.
- [ ] Cellular networks can only be used for making phone calls, not for the internet.

2. Put the steps below in the **correct order** to show how cellular networks send signals over large distances. Number them from 1 to 5.

2 ☐ The signals go to the nearest cell tower.
5 ☐ That device sends signals back to your phone the same way.
1 ☐ Your phone sends out signals when you make a call or use the internet.
3 ☐ The cell tower passes the signals along to other towers or stations.
4 ☐ The signals keep moving until they reach the phone or device you are contacting.

3. **Research Task:** Compare different connections given below.



Feature	Wi-Fi Connection	Cellular Connection	Ethernet Connection
Type of connection	wireless	wireless	wired
Range	short	very long	limited by lenght of cable
Speed	fast	medium to fast	fast
Number of Devices	many devices	usually one mobile	one device per cable
Chance of Interference	high	medium	very low

4. Read the passage and fill in the blanks with the correct words from those given below to complete the meaning.

address	find	talk	device	internet

An IP address is a special number given to every device on a network. It helps to find where data should be sent. When you go online, your device uses its IP address to talk with other devices. This makes sure that data reaches the right device across the internet.

5. What helps data find the best path in a network?

○ Web server ○ Switch ✓ Router

6. Complete the following passage that describes how data travels across a network. Choose words from the list given below:

packets	switches	router	message	webpage

Data travels across a network in small pieces called packets. These packets move from one device to another, passing through switches and routers. The router helps choose the best path for the packets so they reach the right device. The packets are put back together at the end to show the full message, picture, or webpage.

7. Describe in your own words what are packets and what they contain:

When you send a big file or message, it is broken into small blocks called packets.
Each packet contains the data, source and destination addresses, and a packet number so the packets can be put back in the correct order.
Packets can take different paths through a network and are put back together at the destination to complete the message.



Packet number:	1 of 3	Packet number:	2 of 3	Packet number:	3 of 3
Sent from:	Arun	Sent from:	Arun	Sent from:	Arun
Sent to:	Sofia	Sent to:	Sofia	Sent to:	Sofia
Packet data:	THIS IS A	Packet data:	MESSAGE	Packet data:	FOR SOFIA

Task 8: Q & A (Part 2)

8. Why do networks split data into packets?

Networks split data into packets so it can travel faster and more efficiently. If one packet is lost or damaged, only that packet needs to be sent again, not the whole file.



Step 4
Packets are put back in order to complete the message.

9. The steps below show how data is sent across a network, from your device to another device. The steps are in the wrong order! Number them 1 to 10 to show the correct order of how data travels across a network.

6	The packets pass through a **switch** to reach the right local device or router.
4	Each packet is given a **source address** and a **destination address**.
2	Your device turns your request into **data**.
1	You ask for something online, like opening a website or sending a message.
7	The packets go to a **router**, which picks the best path across the network.
10	The packets are put back together in the correct order so you see the full message, picture, or website.
3	The data is broken into small pieces called **packets**.
8	The packets travel through wires, fiber cables, or wireless signals, moving across different networks.
5	The packets are sent out from your device onto the network.
9	The packets reach the right device (like a web server or a friend's phone).

10. Write **two** benefits of sending data in packets?

Data travels faster and more efficiently.

If a packet is lost, only that packet is sent again instead of the whole file.

11. Write any **two** drawbacks of sending packets?

Some packets may be lost or delayed.

Packets may arrive in the wrong order and need to be rearranged.

12. In packet switching, why do some **packets** arrive sooner than others?

Packets may travel through different routes across the network.

Some routes are faster or less busy, so those packets reach

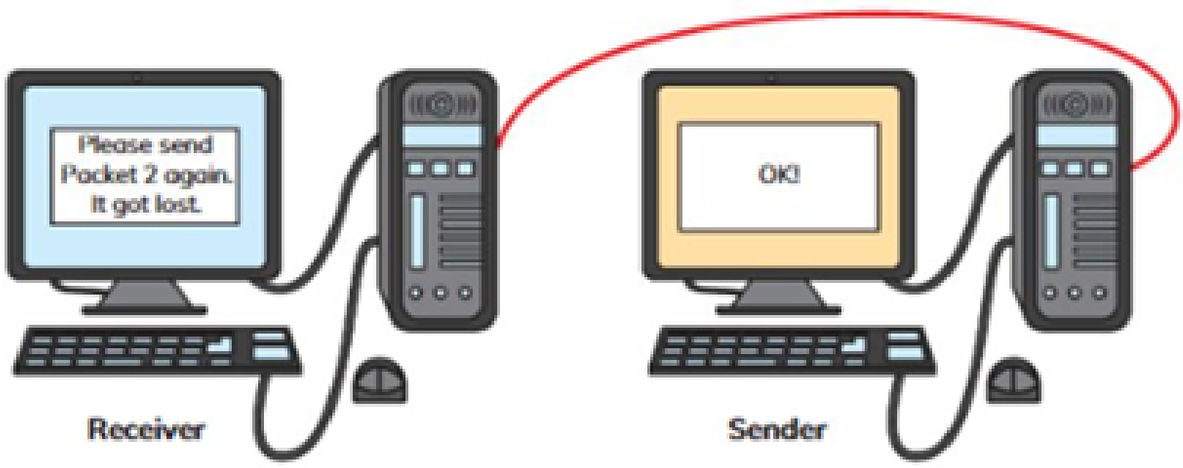
the destination first.

13. What happens if some of the packets are **lost**?

If some packets are lost, the network requests them to be sent again.

Once all the packets arrive, they are put back together to form

the complete data.



Task 9: Complete the Sentences with the Correct Term

Choose the correct words from the box given below and fill in the boxes with the appropriate answers. Be Careful! A word may be used more than once!

outage	**devices**	**damaged**	**failure**	**networks**
major	**load**	**down**	**hardware**	**Weather**
websites				

1. The internet is a connection of many networks across the world.
2. A network failure can be minor or major.
3. A common reason for a broken connection is a damaged cable.
4. Network failures may be caused by faulty hardware used in the network.
5. Devices may not work properly when the network is down.
6. Restarting the devices can sometimes fix minor issues.
7. Power outage can cause a network to stop working.
8. Storms and damage caused by the weather can affect connections.
9. Network failures interrupt access to websites for example www.youtube.com.
10. When networks fail, websites may not load.
11. A slow connection can also be a sign of a failure.

Task 10: Analyze and Answer

1. Differentiate between minor and large network failure. You can **use an online resource** to help you do this research work.

	Minor Network Failure	Large Network Failure
What it means?	A small issue that effect single device and issues	a Major issues that affect may user or entire areas
Who it effects?	one person, small group	many people, companies or cities
Examples	wifi not working on your laptop	the whole internet gone down in city
How long does it last?	a few minutes to hour	hours or even days
Common causes	loose cables, devices glitch	power outage swere clashes
How to fix it?	restart router and devices	IT experts service providers

2. **What happens** when a connection breaks? And **why** do connections break?

How: When a connection breaks, your device cannot send or receive data.

You might not be able to load websites or use apps.

Reason: Connections break because of signal problems, broken hardware, software issues, or weather damage.

3. What are the **causes** of large-scale network failures?

Power failures

Storms or weather damage

Software or hardware issue in data centers

Cyberattacks or computer viruses

Overloaded networks (too many users)

Task 11: Minor or Large?

Carefully read each scenario and decide whether it is **minor** or **large** network failure. Circle your choice.

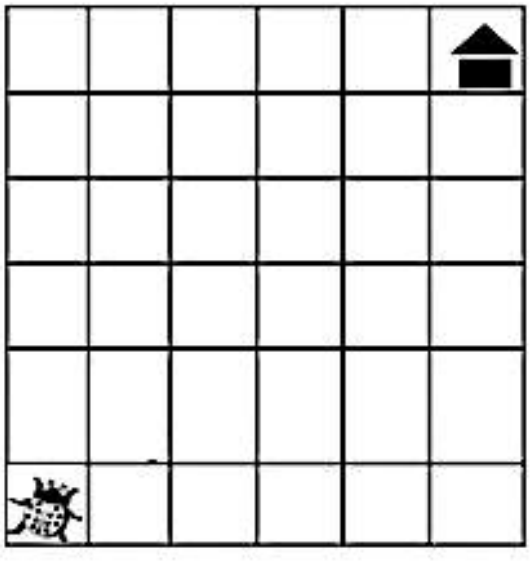
	Scenarios	Type of Network Failure
1	You are trying to watch a video on your tablet at home, but it keeps pausing. Your brother's phone is still working fine on the same Wi-Fi.	Minor / Large
2	At school, no one in your class can connect to the internet, and even the teacher's computer is not working online.	Minor / Large
3	Only your laptop can't connect to Wi-Fi, but your friends' laptops are working fine in the same room.	Minor / Large
4	The whole school has no internet connection for the entire morning, and the IT teacher says there's a problem with the main network.	Minor / Large
5	You unplugged the Wi-Fi router at home by mistake, and now nobody can use the internet until it's plugged back in.	Minor / Large
6	You are at a library where all the computers suddenly lose internet access. The librarian says the internet is down for the whole area because of a problem with the internet provider.	Minor / Large

Task 1: Variable Review

1. What type of value (**Number or Word**) would you give to each of the things listed in the table? Looking at the name of the variables will guide you:

Items	Value
Birthday	number
Age	number
Name	text
Height	number
Color of your T-shirt	text
Shoe size	number
Favorite color	text

2. You are going to write a plan (an algorithm) that gets the ladybug to the bug hotel on the top right of the grid shown below. We are using a variable by the name Count. The number stored in the variable count is 2. This means the loop will repeat twice. The number stored inside the variable, Count, is 2. This means the loop will repeat twice.



3. The ladybug starts in the bottom left square. What number should the variable count hold to make sure the ladybug can get to the bug hotel?

5

4. What value would we need to assign to Count if we moved the ladybug one square up and right, as shown in the picture? 1

We can write our algorithm like this:

In this algorithm, we use the variable Count to store the number of repetitions. We instruct the variable to store the number of repetitions like this:

so **SET COUNT TO 5**

is like putting the number 5 into our box.

```
1  set Count to 5
2  REPEAT Count
3      Move forward
4      Turn right
5      Move forward
6      Turn left
```



Task 2: Unplugged Activity 1

Look at the pictures from the children's birthday party.

See the details given **below and fill** in the **Name** and the **Age** variable value **in the** rows given **below** the pictures for each of the picture's A, B and C.

A

Kitty is 9



B

Jona is 10



C

Dora is 8



	A	B	C
Value for **Name** Variable	kitty	jona	dora
Value for the **Age** variable	9	10	8

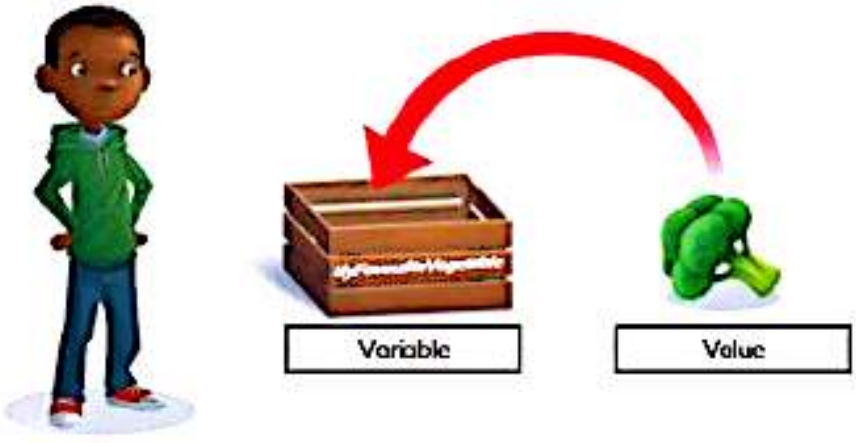
Task 3: My Favorite Vegetable

Maaz is using a variable for storing his favorite vegetable. He gives the variable the name **MyFavoriteVegetable.**



Maaz wants the program to store his favorite vegetable: broccoli.
He assigns the MyFavoriteVegetable variable the value 'Broccoli' like this:

Set MyFavoriteVegetable to broccoli



1. Write an algorithm to assign the *MyFavoriteVegetable* Variable to your own favorite vegetable:

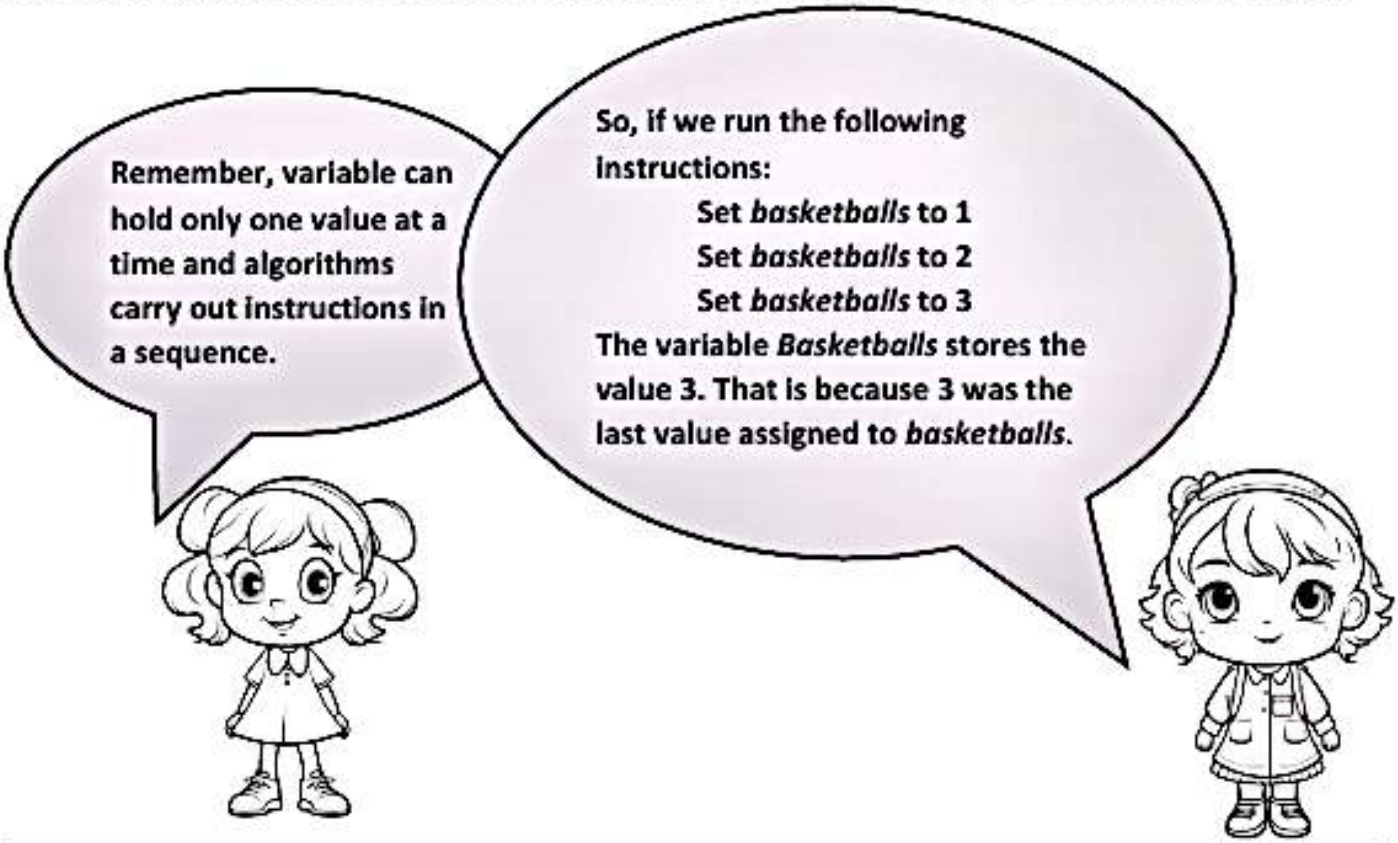
```
START
Set MyFavoriteVegetable to "Carrot"
END
```

2. Maaz wants to add a variable to his algorithm that stores his favorite fruit. What meaningful name would you give this variable?

```
MyFavoriteFruit
```

Task 5: What is the value of Result?

Follow each algorithm and write down the value assign to the last variable in the sequence of instructions.



Algorithm	Questions
Set NumberOne to 5 **Set NumberTwo to 5** **Set Result to NumberOne + NumberTwo**	1. What is the value of **Result**? 10
Set RedApples to 20 **Set GreenApples to 5** **Set TotalApple to RedApples + GreenApples**	2. What is the Value of **TotalApple**? 25
Set BasketBall to 3 **Set VolleyBall to 1** **Set SportsBall to BasketBall + VolleyBall**	3. What is the value of **SportsBall**? 4
Set Ducks to 20 **Set Chickens to 40** **Set Birds to Ducks + Chickens** **Set Ducks to 2** **Set Birds to Birds + Ducks**	4. What is the value of **Birds**? 62
Task: Create your own **two** variables. Assign a Value to each of them. **Add** the values together and assign the results to the **third** variable.	Set suzuki to 3 set honda to 4 set cars to suzuki + honda 3+4 = 7

Task 6: Comparison Operators – Check your Understanding

1. Look at the following set of instructions that end with a condition. Evaluate them and write down whether the condition is **true** or **false**.

	Instructions	True / False
1	a. Set **Volume** to **full** b. **Is Volume** equal to **full**?	true
2	a. Set **CorrectPassword** to 123ABC b. Set **UserPassword** to CBA321 c. Is CorrectPassword equal to UserPassword?	no

2. What should be the value of variable **Volume** for instruction **1b** to be False?

Volume should be set to something other than full, for example low.

3. What should the value of variable **UserPassword** for instruction **2b** need to be for **2c** to become True?

UserPassword = 123ABC

4. Can you think of a situation in your everyday life where you use **'equal to'** comparison operator?

When checking the price of an item, we can compare: "Is the price equal to Rs. 500?".

Task 7: Variables in Algorithm and Selection

Look at the following steps of an **Algorithm for a night light.**

Steps	Set of Instructions
1	Start the program when button A is pressed.
2	Create a variable called **light**.
3	Set **light** to randomly pick a whole number from 0 to 5
4	**If light** is equal to 5 then
	Show all LEDs lighting
	Else
	Clear Screen
5	Stop program

From the algorithm identify the following:

a) The input to the program: button A pressed

b) The variable: light

c) The outcome when the condition is true: show all LED lightning

d) The outcome when the condition is false: clear screen

Task 8: Linear vs. Selection Algorithm

Compare linear algorithm and algorithm with selection for a morning routine.

Morning routine – Linear	Morning routine – Selection
1 Wakeup 2 Get out of bed 3 Take a shower 4 Get Dressed 5 Eat breakfast 6 Brush your teeth 7 Go to school	1 Wake up 2 Get out of bed 3 IF **ShoweredLastNight** equals to YES THEN Get Dressed ELSE Take shower Get Dressed 4 Eat Breakfast 5 Brush your teeth 6 IF **SchoolDay** equal to YES THEN Go to school

1. How many actions will the **linear** algorithm carry out when run?

   7

2. How many actions will the algorithm with selection carry out when it runs as follows:

   a) Set ***ShoweredLastNight*** to NO and ***SchoolDay*** to NO.

   6

   b) Set ***ShoweredLastNight*** to NO and ***SchoolDay*** to YES.

   7

   c) Set ***ShoweredLastNight*** to YES and ***SchoolDay*** to YES.

   6

   d) Set ***ShoweredLastNight*** to YES and ***SchoolDay*** to NO.

   5

Task 10: Conditional Statements

We make decisions everyday based on different situations. What decision would you make for each scenario below:

- If my tablet battery is low, then I will ___charge___.
- If it is raining outside, then I will use an ___umbrella___.
- If the alarm clock rings, then it is time to ___wakeup___.
- If I am tired, then I will ___rest___.
- If the school bell rings, then it is time for ___study___.

Types of Selection Algorithms

Decisions in programming are known as selection. Selection lets the program decide which instruction to follow next.

There are two types of selection statements.

a. **IF-----THEN**

Used to make a decision in an algorithm. If the condition is true, then the specified action is carried out.

Examples:

a. If I am hungry, then I will eat.
b. If a polygon has three sides, then it is a triangle.
c. If I complete my homework, then I can play video games.
d. If it is my birthday, then I will get cake.

b. **IF----THEN----ELSE**

Used when there are two possible outcomes.

A condition is checked: If the condition is true, one action takes place; otherwise, a different action takes place.

Examples:

a. If it is raining, then take an umbrella, else wear sunglasses.
b. If homework is complete, then play games, else finish your homework first.
c. If marks are 50 or more, then pass, else fail.
d. If the sprite touches the edge, then turn around, else keep moving forward.

Task 12: Identify the Different Parts & Possible Outcomes

1. The following are two algorithms. Identify the **condition** and **conclusion** and **possible outcomes** for each of the above algorithms:

Algorithm for a Balloon	Algorithm for Avery
1 Start the program 2 Show Balloon on screen 3 Set Balloon size to 20% 4 Increase Balloon size to 20 5 Wait 1 second 6 If Balloon is touching the mouse pointer, then Hide Balloon on screen Play the pop sound until done 7 Repeat steps 4 to 6 forever 8 Stop program	1 Start the program 2 Set Avery position to x = -170 , y = -13 3 Move 20 steps forward 4 Change to the next Avery walking costume 5 Wait 0.5 seconds 6 If Avery touching Ahmad, then Say 'Hello' 7 Repeat steps 3 to 6 forever 8 Stop program
Condition: Balloon is touching the mouse pointer.	**Condition:** Avery is touching Ahmad.
Conclusion: Hide the Balloon and play the pop sound.	**Conclusion:** Avery says "Hello."
Possible Outcomes: If the Balloon touches the mouse pointer → Balloon pops and disappears.	**Possible Outcomes:** If Avery touches Ahmad → Avery says "Hello."

2. Predict the **outcomes** of the algorithm given below:

Algorithm 1	Algorithm 2
1 Start the program when any key is pressed. 2 If the space key is pressed, then Glide 5 seconds to x=193, y= -115 3 Play sound car horn until done 4 Stop the program	1 Start the program 2 If Danish is touching food truck, then Say 'stop' for 2 seconds 3 Stop the program.
Possible Outcomes: If the space key is pressed, the character will glide for 5 seconds to x = 193, y = -115. Then, the car horn sound will play. If any other key is pressed, the glide action will not happen, but the car horn sound will still play	**Possible Outcomes:** If Danish is touching the food truck, Danish will say "stop" for 2 seconds. If Danish is not touching the food truck, nothing will happen and the program will stop.

Task 13: Questions – IF-THEN-ELSE

Read the following IF THEN ELSE statement and answer the questions given below.

1. **IF** Time equals to Morning
   THEN
   say "Good Morning"
   ELSE
   Say "Good Afternoon"
2. Say "How are you?"

1. What will the algorithm say if the condition is **true**?

   The algorithm will say "Good Morning."

2. What will the algorithm say if the condition is **false**?

   The algorithm will say "Good Afternoon."

3. What will the algorithm say **regardless of** whether the condition is true or false?

   The algorithm will say "How are you?"

Task 11: Analyze Condition vs. Conclusion

1. Look at the following If – Then statements. Identify the **condition** and **conclusion**.

Statement	Condition Part	Conclusion Part
a) **If** I am hungry, **then** I will eat.	If i am hungry	i will eat
b) **If** a polygon has three sides, **then** it is a triangle.	a polygon has three sides	its a triangle
c) **If** I complete my homework, **then** I can play video games.	i complete my homework	i can play video games
d) **If** it is raining, **then** I will stay indoors.	it is raining	i will stay indoor
e) **If** it is my birthday, **then** I will get cake.	it is my birthday	i will get a cake

2. Complete the algorithms below to show that when the green flag is clicked, **The Butterfly** glides for 1 second towards the **Bat. If the Bat** touches the **Butterfly,** then **Bat** will go to a random position.

Algorithm for Butterfly	Algorithm for Bat
1 Starts when green flag clicked 2 Glide for 1 second toward bat 3 Stop program	1 Starts when green flag clicked 2 Wait 1 second 3 If the bat is touching the butterfly Then Go to a random position 4 Stop program