

June 2020



# Programming 2.0

Security – Week 6

Guru Anginthayya

# Agenda – Week 6

- + Review – Week 5
- + Cyber Security
  - + Malware
  - + Virus
- + Strong password requirements
- + Ethical Hacking
- + Code - Cookie thief
- + Code – Password generator
- + Home work discussion



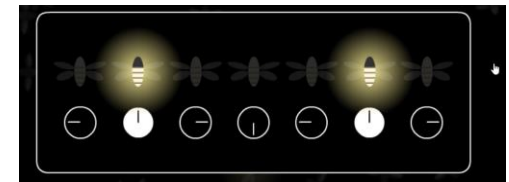
# Review – Week 5

- + Algorithms & Programs
  - + How to read the program
  - + How to improve the program
- + Flowcharts
  - + Terminator
  - + Process
  - + Decision
  - + Flow
- + Micro:bit – Radio
  - + Firefly
- + Homework
  - + Flowchart to order the pizza

```
on start
  radio set group 1
  set clock to 0
  set NoonTime to 8

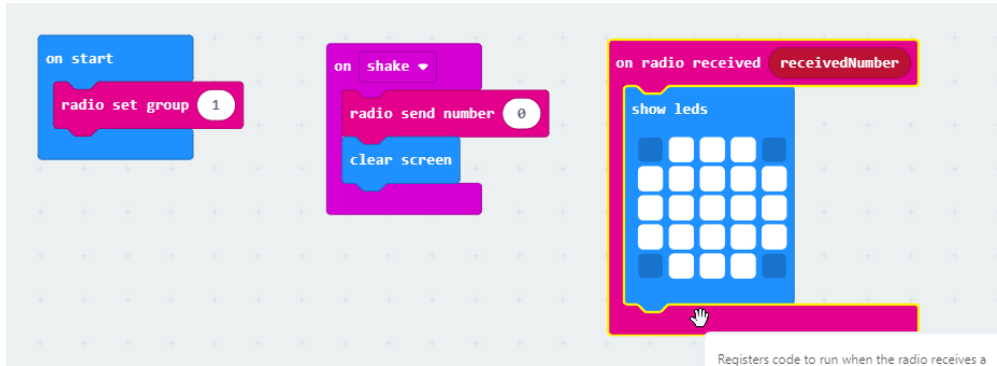
on radio received receivedNumber
  change clock by 1

forever
  if clock >= NoonTime then
    change score by 1
    radio send number 0
    pause (ms) 200
    set clock to 0
  else
    pause (ms) 100
    change clock by 1
```



# Radio - Pass the Basketball Game

## + Radio 1 – Download

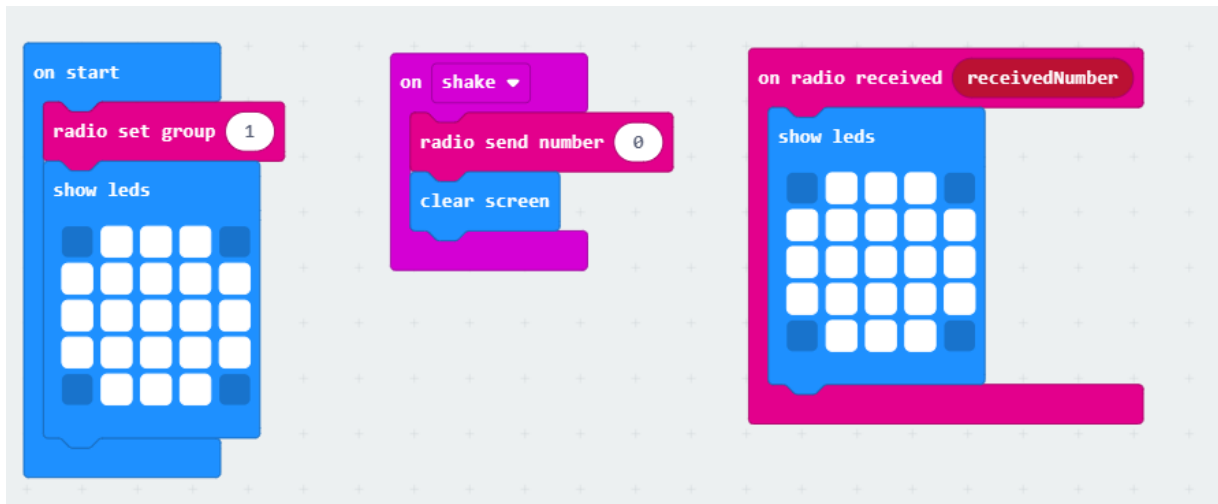


The image shows three Scratch code blocks on a grid background:

- on start** (blue):
  - radio set group 1
- on shake** (purple):
  - radio send number 0
  - clear screen
- on radio received** (pink) with a variable `receivedNumber`:
  - show leds (with a 5x5 grid of 25 white squares)

Registers code to run when the radio receives a

## + Radio 2 -



The image shows three Scratch code blocks on a grid background:

- on start** (blue):
  - radio set group 1
  - show leds (with a 5x5 grid of 25 white squares)
- on shake** (purple):
  - radio send number 0
  - clear screen
- on radio received** (pink) with a variable `receivedNumber`:
  - show leds (with a 5x5 grid of 25 white squares)



# Cyber security - Malware

+ Short for malicious software

+ Attacks computers & digital devices

+ Corrupt/harm the software

+ Steal users' data

+ Types include:

+ Viruses - program code that attaches itself to application program and when application program run it runs along with it.

+ Worms - A worm is a special kind of computer virus that propagates by self-replication over a computer network



Edit

## Computer Virus

## Computer Worm

**How does it infect a computer system?**

It inserts itself into a file or executable program.

It exploits a weakness in an application or operating system by replicating itself.

**How can it spread?**

It has to rely on users transferring infected files/programs to other computer systems.

It can use a network to replicate itself to other computer systems without user intervention.

**Does it infect files?**

Yes, it deletes or modifies files. Sometimes a virus also changes the location of files.

Usually not. Worms usually only monopolize the CPU and memory.

**whose speed is more?**

virus is slower than worm.

worm is faster than virus. E.g. The code red worm affected 3 lack PCs in just 14 Hrs.

**Definition**

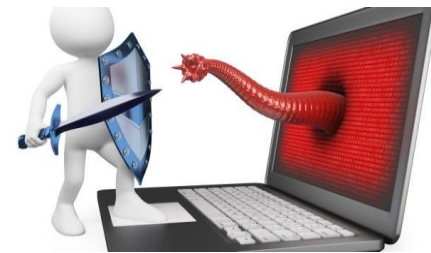
The virus is the program code that attaches itself to application program and when application program run it runs along with it.

The worm is code that replicate itself in order to consume resources to bring it down.



# Cyber security

- + What is Cyber Security?
  - + The protection of internet systems (hardware, software, data etc) from cyber attacks
- + Why does it matter?
  - + It is important because without it you are leaving yourself open to cyber attacks e.g. you could have your identity stolen or your even your money
- + Cyber security is a global problem
- + Hacking is legal?
  - + No



# Cyber security – Ethical Hacking

- + Ethical or white hat hackers locate weaknesses and vulnerabilities of computer systems by trying to hack them.
- + This helps companies to protect their computer systems from hackers.
- + Uses hacking skills in a legitimate, lawful manner to try to find vulnerabilities and fix them before the bad guys can get there and try to break in.
- + They break into systems legally and ethically
- + Examine patch installations and make sure that they cannot be exploited.



# Cyber security - Password

## + Password Breach

- + When a hacker guesses or finds your password & Allows them to gain access to your accounts
- + They could gain access to your email, social media, or bank account

## + Guess the password

- + Sam was born in 2012 and has a dog called Remo
- + Can you guess the password – **Remo12**

## + Why are strong passwords important?

- + Many passwords are easy for hackers to guess & They let hackers gain access to data easily
- + Strong passwords make it harder for hackers to guess
- + They protect personal information, data and computer systems

## + How strong are your password?

- + <https://howsecureismypassword.net/>

## + What makes a strong password

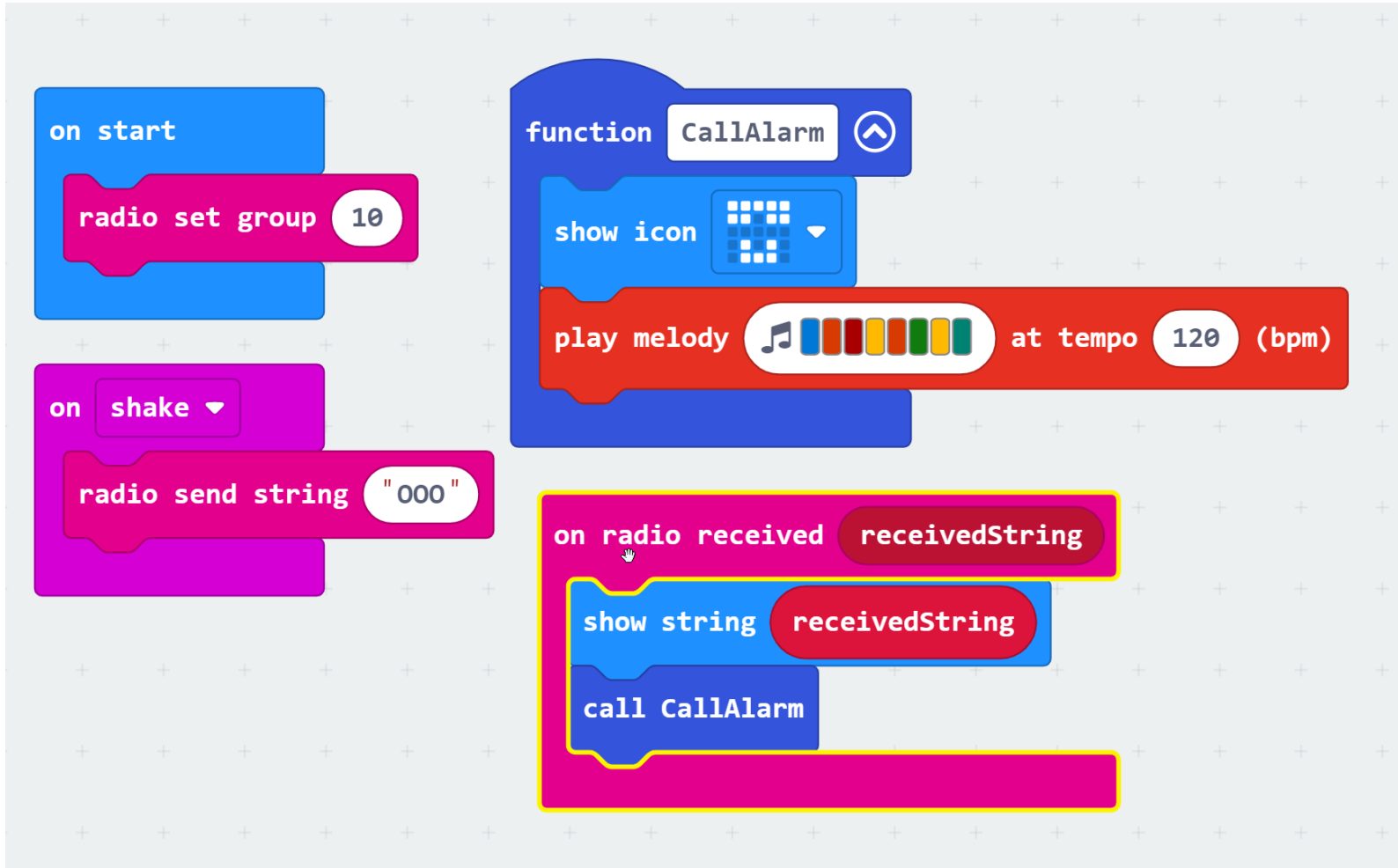
- + Long, String & Complex - numbers, characters, uppercase and lowercase letters. At least 8 in length
- + Hard to guess - avoid family / pet names, sequential numbers or date of birth
- + Use different passwords – Don't use the same password for everything

## + Password generator - <https://passwordsgenerator.net>





# Security – Cookie thief



# Radio – Tell me a secret

```
on start
  radio set group 10

on button A pressed
  radio send string "yes"
  show icon
  pause (ms) 500
  clear screen

on button B pressed
  radio send string "no"
  show icon
  pause (ms) 500
  clear screen

on radio received receivedString
  if receivedString = "yes" then
    show icon
    pause (ms) 500
    clear screen
  else if receivedString = "no" then
    show icon
    pause (ms) 500
    clear screen
```

The image displays a Scratch script for a radio-based game titled "Tell me a secret". The script is organized into three main sections:

- on start:** A blue block containing a pink "radio set group" block with the value "10".
- on button A pressed:** A pink block containing a sequence of blue blocks: "radio send string" with the value "yes", "show icon", "pause (ms)" with the value 500, and "clear screen".
- on button B pressed:** A pink block containing a sequence of blue blocks: "radio send string" with the value "no", "show icon", "pause (ms)" with the value 500, and "clear screen".
- on radio received receivedString:** A pink block containing a teal "if" block. The "if" block has two conditions: "receivedString = 'yes'" and "receivedString = 'no'". Each condition is followed by a "then" block containing a sequence of blue blocks: "show icon", "pause (ms)" with the value 500, and "clear screen".



# References

+ Micro:bit Educational Foundation [microbit.org](https://microbit.org)

