



**CODE**  
WITH US

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# COMPUTER SCIENCE

## GAME DESIGN IN SCRATCH



# LEVEL 1 - SCRATCH

DURATION - 5 WEEKS (1 TO 2 HRS/WK)

EVENTS TO TRIGGER CODE

FOREVER LOOP TO REPEAT CODE OVER AND OVER

IF STATEMENTS TO CHECK CERTAIN SITUATIONS

## SAMPLE PROJECTS

- SPACE DASH (USER WILL CONTROL THE ASTRONAUT WITH THE MOUSE TO COLLECT CRYSTALS AND GAIN POINTS)
- DINO CLICKER (USER WILL CLICK ON DINO CHARACTER TO GAIN POINTS AND MAKE IT DANCE)
- LOST IN SPACE (USER WILL CONTROL THE CHARACTER WITH ARROW KEYS TO MOVE IT AROUND A MAZE. THE USER WILL COLLECT ITEMS TO WIN THE GAME. IF THE CHARACTER TOUCHES THE WALLS, IT WILL BE TRANSPORTED TO THE BEGINNING OF THE GAME)
- METEOR HARVEST (USER WILL CONTROL THE SPACESHIP WITH THEIR MOUSE AROUND THE PLANET TO COLLECT THE FUEL. IF THE SPACESHIP TOUCHES THE PLANET IT WILL BE FORCED TO RESTART FROM THE BEGINNING)

# LEVEL 2 - SCRATCH

DURATION - 5 WEEKS (1 TO 2 HRS/WK)

XY PLANE AND MOVEMENT

USING GREATER THAN (>) AND LESS THAN (<) TO CHECK SITUATIONS IN OUR GAMES

BROADCAST MESSAGES TO TRIGGER OTHER CHARACTERS IN THE GAME

## SAMPLE PROJECTS

- TRICERATOPS JUMP (USERS WILL USE ARROW KEYS AND SPACE BAR TO MOVE AND JUMP ON PLATFORMS TO TRY AND CATCH A DRAGONFLY)
- DROID ESCAPE (USERS WILL USE ARROW KEYS TO GUIDE A CHARACTER ACROSS SPACE WHILE TRYING TO AVOID ROBOTS THAT ARE MOVING BACK AND FORTH ON THE SCREEN)
- DOT RESCUE (A GAME WHERE YOUR MISSION IS TO RESCUE DOT THE ASTRONAUT DOG FROM THE FALLING METEOR ROCKS. CLICK THE ROCKS WITH YOUR MOUSE TO BREAK THEM BEFORE THEY FALL ON DOT!)
- COLLISION COURSE (A GAME WHERE YOU NEED TO RESCUE KIRAN WHO IS TRYING NOT TO FLOAT AWAY INTO SPACE BY BOUNCING ON NEARBY METEORS. USE THE ROCKETSHIP'S SPEED TO PICK KIRAN UP AND TAKE HIM TO SAFETY QUICKLY!)

## LEVEL 3 - SCRATCH

DURATION - 5 WEEKS (1 TO 2 HRS/WK)

VARIABLES TO KEEP TRACK OF SCORES IN GAMES

PEN BLOCKS TO DRAW ON THE SCREEN WITH CHARACTER MOVEMENTS

SOUND BLOCKS TO ADD MUSIC AND SPECIAL EFFECTS TO GAMES

### SAMPLE PROJECTS

- STAMP REX (A GAME WHERE YOU GET TO USE THE T-REX SPRITE TO DRAW STAMPS OF MULTIPLE COLORS ON THE STAGE. CREATE A BEAUTIFUL ABSTRACT CREATION USING JUST A SINGLE SPRITE.)
- DOT TRAIL BLAZE (DOT IS SETTING OFF ON A WONDROUS TRAILBLAZING ADVENTURE. HELP DOT TRAVEL AS FAR AS POSSIBLE WITHOUT COLLIDING INTO HER OWN TRAIL OR THE EDGE OF THE STAGE!)
- MOON BOUNCE (A GAME WHERE YOU NEED TO KEEP YOUR SPACESHIP MOVING TO AVOID GETTING HIT BY THE GIANT INCOMING ROCK RUBBLE. MAKE SURE YOU BOUNCE IN BETWEEN THE RUBBLE TO SAFETY!)
- STAR BURST (A GAME WHERE THE USER CAN INTRODUCE VARIOUS SOUNDS AND WATCH THE DINOSAURS INTERACT WITH THE SOUNDS. TRY PLAYING DIFFERENT MUSIC AND SEE HOW THEY INTERACT WITH IT!)

## LEVEL 4 - SCRATCH

DURATION - 5 WEEKS (1 TO 2 HRS/WK)

LOOKS BLOCKS TO HIDE AND SHOW CHARACTERS, CHANGE EFFECTS

CREATE CLONES OF CHARACTERS AND HOW TO GIVE THEM INSTRUCTIONS

JOIN BLOCKS TO FORM CUSTOM SENTENCES WITH USER INPUTS AND VARIABLES

### SAMPLE PROJECTS

- DOT GRAVITY (A GAME WHERE YOU MUST HELP DOT THE PUP AVOID THE WRATH OF THE ALIENS TRYING TO GET HER. JUMP OVER THE ALIENS TO SAFETY AND TO THE HIGHEST SCORE IN THE GALAXY!)
- SATURN SLICE (A GAME WHERE YOU SLICE THE ALIENS TRYING TO TAKE OVER THE GALAXY! BOUNCE THE SATURN PLANET OFF OF THE PLATFORM TO STEER IT TOWARDS THE ALIENS)
- COLOR MINGLE (A PROJECT RELATED TO MAKING FUN ART DESIGNS IN THE STAR-RICH SKY! USE YOUR DINOSAURS TO LEAVE A STUNNING DISPLAY OF COLOR AND DELIGHT IN THE SKY!)
- FEEDING FRENZY (A GAME WHERE YOU MUST LEAD THE MOMMA PTERODACTYL TO FEED ITS YOUNG AND FAST-GROWING BABIES! EACH TIME YOU GIVE A BABY A FISH TO EAT THE BABY WILL GROW AND YOUR SCORE WILL ALSO INCREASE)



# LEVEL 5 - SCRATCH

DURATION - 5 WEEKS (1 TO 2 HRS/WK)

RANDOM NUMBERS IN GAMES TO MAKE THEM MORE INTERESTING  
MATH OPERATORS IN SCRATCH TO CALCULATE EQUATIONS  
BOOLEAN OPERATORS: NOT, AND, OR

## SAMPLE PROJECTS

- DINO SAFARI (A GAME WHERE YOU MUST HUNT DOWN THE CARNIVOROUS DINOSAURS AND SAVE THE PLANT-BASED DINOSAURS! YOU WILL LOSE POINTS IF YOU ACCIDENTALLY SHOOT THE PLANT-BASED DINOSAURS SO WATCH OUT!)
- JURASSIC MATH (A GAME WHERE YOU HAVE TO ANSWER AS MANY MATH PROBLEMS CORRECTLY AS POSSIBLE. EVERY TIME YOU ANSWER A QUESTION RIGHT THE T-REX WILL DANCE AROUND!)
- PTERODACTYL SPELUNK (A GAME WHERE YOU MUST HELP THE PTERODACTYL THROUGH THE CAVE. WATCH OUT FOR THE CAVE WALL SPIKES BECAUSE IF YOU TOUCH ONE YOU LOSE!)
- DINO EGG HUNT (A GAME WHERE YOU MUST HELP THE BRACHIOSAURUS TO THE OTHER SIDE TO SAVE ITS BABY EGG FROM THE INCOMING PTERODACTYLS! USE THE SPACE KEY TO SEND YOUR DINO ON THE EGG HUNT)

# LEVEL 6 - SCRATCH

DURATION - 6 WEEKS (1 TO 2 HRS/WK)

COLOR SENSING AND EDGE SENSING BLOCKS  
VIDEO SENSING BLOCKS TO USE USER MOVEMENT ON CAMERA  
DIFFERENT TYPES OF LOOPS LIKE REPEAT UNTIL AND REPEAT

## SAMPLE PROJECTS

- INVASION SWAT (A GAME WHERE YOU HAVE TO KEEP OUR WORLD SAFE FROM THE AI ROBOTS! USE THE MOTION OF YOUR HANDS (OR HEAD) TO SWAT THE EVIL ROBOTS AWAY!)
- FIRE ALERT (A GAME WHERE THE USER USES THEIR HANDS AND BODY MOVEMENT TO PUT OUT THE FIRE THAT IS TRYING TO DESTROY THE SPACESHIP FROM THE INSIDE OUT!)
- SKY CATCH (A GAME WHERE YOU GET TO PLAY WITH YOUR VERY OWN PET PTERODACTYL! CODE THE BASEBALL TO LAUNCH HIGH UP IN THE SKY WHERE YOUR PET IS WAITING TO CATCH EVERY THROW. MAKE SURE TO AIM BEFORE YOU THROW!)
- CACTUS REX (A GAME WHERE YOU MUST HELP THE T-REX JUMP OUT OF A SPIKY SITUATION. ALSO BEWARE OF THE FLYING PTERODACTYL TRY NOT TO BUMP IT OR ELSE YOU'LL LOSE POINTS!)



# LEVEL 7 - SCRATCH

DURATION - 6 WEEKS (1 TO 2 HRS/WK)

MAKING CUSTOM BLOCKS TO SIMPLIFY CODE  
CLONES TELEPORTING TO OTHER SPRITES  
PEN BLOCKS TO DRAW AND ERASE LINES

## SAMPLE PROJECTS

- ALIEN TURBULENCE (A GAME WHERE YOU HAVE TO DESTROY THE ALIENS WITH YOUR SPACE CANNON. BE CAREFUL, ONE TOUCH BY AN ALIEN, AND THE SPACE JOURNEY IS OVER!)
- DRAW BRIDGE (A GAME WHERE YOU MUST HELP THE DINOSAURS ESCAPE THEIR CRUMBLING PLANET. DRAW A PATH USING YOUR MOUSE POINTER FOR THE DINOSAURS SO THEY CAN REACH THE PORTAL TO TELEPORT TO SAFETY!)
- DINO EGG HUNT II (THE RETURN OF THE MOTHER DINOSAUR TRYING TO SAVE HER EGGS AGAIN FROM A PACK OF T-REX. AVOID TOUCHING THE T-REX OR ELSE YOU WILL LOSE POINTS!)

# LEVEL 8 - SCRATCH

DURATION - 6 WEEKS (1 TO 2 HRS/WK)

LISTS IN SCRATCH TO HOLD INFORMATION  
USING LOOPS TO CHECK LISTS  
LIST FUNCTIONS TO CHANGE ITEMS AND CHECK LIST SIZE

## SAMPLE PROJECTS

- TIC-TAC-TOE (CLASSIC TIC-TAC-TOE GAME AGAINST A SIMPLE COMPUTER STRATEGY)
- POETRY GENERATOR (USING LISTS OF WORDS AND USER-INPUTTED INFO, CREATE A FUN NEW POEM)
- MEMORY GAME (CREATE A CARD MEMORY GAME, TRY TO BE AS FAST AS POSSIBLE!)



# TECHNOLOGY REQUIREMENTS

DESKTOP, LAPTOP OR CHROMEBOOK WITH MICROPHONE AND SPEAKER (CAMERA IS OPTIONAL)

MOUSE FOR EFFICIENT BROWSING

UPDATED WEB BROWSER (EXAMPLE; CHROME, FIREFOX, OR SAFARI)

HIGH-SPEED INTERNET CONNECTION

A PROJECTOR OR SMARTBOARD IN THE CLASSROOM

HEADPHONES ARE RECOMMENDED FOR THE STUDENTS TO EFFECTIVELY COMMUNICATE WITH TEACHERS IN ONLINE CLASSROOMS.

ACCESS TO [HTTPS://PORTAL.CODEWITHUS.COM](https://portal.codewithus.com)

\*THE CLASSES ARE LECTURE STYLE, COMPLETION TIME MAY VARY BASED ON LEARNING PACE AND PRIOR KNOWLEDGE.

