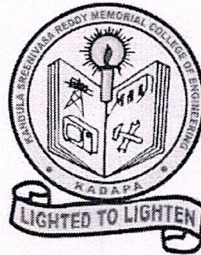Kandula Srinivasa Reddy Memorial College of Engineering (Autonomous)

Kadapa-516003. AP

(Approved by AICTE, Affiliated to JNTUA, Ananthapuramu, Accredited by NAAC)

(An ISO 9001-2008 Certified Institution)

Department of Electronics and Communication Engineering
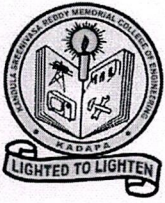

Certification Course

On

"Programming with arduino"

Resource Person   : Sri .R V Sreehari

Course Coordinator: Miss P.Swetha

Duration   :   28-09-2021 to 30-10-2021

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Kadapa, Andhra Pradesh, India - 516003

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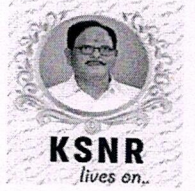
Lr./KSRMCE/ (Department of ECE)/2020-21

Date: 22-09-2021

To
The Principal
KSRM College of Engineering
Kadapa, AP.

Sub: KSRMCE - (Department of ECE) – Permission to conduct a certification course on "Programming with Arduino" –Request– reg.

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Respected Sir,

   With reference to the cited, the Department of ECE is planning to conduct a certification course on "Programming with Arduino" for All B.Tech V SEM students from 28-09-2021 to 30-10-2021. In this regard, we kindly request you to grant us permission to conduct a certification course. This is submitted for your kind perusal.

Thanking you sir,

forwarded to the
principal sir
G. H

Yours Faithfully,
Coordinator

Miss P. Swetha

Cc:

To The Director for Information

To All Deans/HODs

Permitted

V. S. S. Mulg
PRINCIPAL
K.S.R.M. COLLEGE OF ENGINEERING
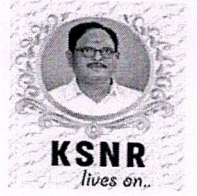KADAPA-516005, (A.P.)

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Date: 22-09-2021

Circular

All the B.Tech V SEM students are hereby informed that the department of ECE is going to conduct certification course on "Programming with Arduino" from 28-09-2021 to 30-10-2021. Interested students may register their names with respective faculty member on or before 26-09-2021.

For any queries contact,

Coordinator

Miss P. Swetha, Assistant Professor, ECE Dept.,

HOD
Professor & H.O.D.
Department of E.C.E.
K.S.R.M. College of Engineering
KADAPA - 516 003

Cc to:

The Management /Director / All Deans / All HODS/Staff / Students for information
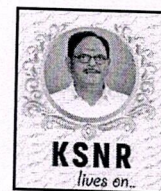
The IQAC Cell for Documentation

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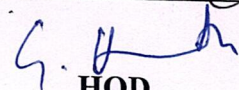### An ISO 14001:2004 & 9001: 2015 Certified Institution

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Department of Electronics & Communication Engineering
Certificate Course on Programming with Arduino
Registration Form

S.No.	Roll.No.	Name of the Student	Branch	Sem	Signature
1	1994IA0401	A. Venkatesh	ECE	V	A Venkatesh
2	1994IA0402	A. Couleeswara Reddy	ECE	V	A. Couleeswa.
3	1994IA0403	ANGAJALA KAVYASREE	ECE	V	A. Kanya
4	1994IA0407	AAV Pavan Kumar Reddy	ECE	V	A V Pavan
5	1994IA0408	B. Ajay Kumar	ECE	V	B. Ajay Kumar
6	1994IA0409	B. sai balaji	ECE	V	B. Sai balaji
7	1994IA0411	B. Uday Kumar	ECE	V	B. Uday
8	1994IA0412	B. Sreenath	ECE	V	B. Sreenath
9	1994IA0413	B. V. Tharun kumar	ECE	V	B. r Thru
10	1994IA0414	B. sai DEEPak	ECE	V	B. Saideepak.
11	1994IA0415	B. V. Sainath Reddy	ECE	V	B. V. Sainath Reddy
12	1994IA0417	C. Jaswanth varma	ECE	V	C. Jashwanth
13	1994IA0418	C. Tejesh Kumar Reddy	ECE	V	C. TejyKR
14	1994IA0419	C. Stephen kumar	ECE	V	C. Stephenkumar
15	1994IA0420	C. Rajesh	ECE	V	C. Raje
16	1994IA0421	C. Sai susmitha	ECE	V	C. Sy
17	1994IA0422	C. vara prasad reddy	ECE	V	C. vara
18	1994IA0423	C. Guru deekshith	ECE	V	C. Guche
19	1994IA0424	C. Ankaiah	EEE	V	C. Ank
20	1994IA0425	C. saiprakash Reddy	ECE	V	C. Saiprash
21	1994IA0427	C. Sai Dheeraj	ECE	V	C. Sai Dheeraj
22	1994IA0428	C. Sandeep Reddy	ELE	V	C. Sandeep.
23	1994IA0430	C. veera Siva	ECE	V	C.V.Siva

24	1994IA0431	Chintha Lapalli madhurarima	ECE	V	A.C.madhurima
25	199YIA0432	D. Mounika	ECE	V	D.Mounika
26	1994IA0433	D. Sai kumar	ECE	V	D.Sai kumar
27	1994IA0436	D. Hari Priya	ECE	V	D. Hari Priya
28	1994IA0437	D.Vikas Bharadwaj Reddy	ECE	V	D. Vikas
29	1994IA0440	Gr. upendra	ECE	V	Gr.uprend
30	199YIA0441	G. ANUSHKA	ECE	V	Anushka
31	1994IA0448	G. Prasanna kumar	ECE	V	Prasanna
32	199YIA0449	G. Vishnu vardhan reddy	ECE	V	(V)
33	1994IA0451	G. Sreedhanya	ECE	V	sreDhar
34	199YIA0452	Q. SHARATH	ECE	V	Sharath
35	199YIA0456	J. VINOD	ECE	V	Vinod
36	1994IA0459	K. Soumya Priya	ECE	V	Soumya
37	1994IA0460	K. Sagar	ECE	V	Sagar
38	199YIA0461	k. sai Bharath	ECE	V	Bharath
39	1994IA0463	K. SReevidya	ECE	V	
40	199YIA0468	k. Vinay	ECE	V	k. Vinay
41	199YIA0471	K. sai charan	ECE	V	K.sai
42	1994IA0473	K.E. Rachana Ravindra	ECE	V	K.E.R.Rav
43	199YIA0479	K. venkatesh	ECE	V	k. Venkatesh
44	1994IA0483	K. Lakshmanna	ECE	V	k. lalas
45	199YIA0484	K. Sai Prakash	ECE	V	K. Sai Prakash
46	199YIA0485	K. Jaswanth Reddy	ECE	V	K. Jaswanth
47	199YIA0487	M. Sai vardhan Naidu	ECE	V	M.Srr
48	1994IA04E4	S. mohammed Yaseen	ECE	V	S. Yaseen
49	199YIA04E5	S. Munazzah Fatima	ECE	V	S. Munazzah
50	1994IA04E7	S. Rummesa kousar	ECE	V	S. Rummesa kousar
51	1994IA04E8	S. Sadak Ali	ECE	V	Sadak
52	1994IA04F0	S. Sudharshan	ECE	V	sudhar
53	1994IA04F1	S. sameer ahammad	ECE	V	s.ahmee
54	199YIA04F3	S. Venkata naga Sai	ECE	V	S. Naga Sai

Coordinator(s)

HOD

Certification Course on "Programming with Arduino"

[30 hours]

Course Objectives:
- Understand about Arduino hardware and software.
- Learn the basic programming with Arduino.
- Gain knowledge to verify working of simple sensor circuits with Arduino kit.

Course Outcomes:
- Program the Arduino
- Prototype the circuits and connect them to the Arduino
- Design an arduino based system to solve real time problems. (Prepare a case study model to get a first prototype)

UNIT I

Introduction: Introduction to an Embedded System, block diagram of an embedded system, advantages of an embedded systems, applications of an embedded system, microprocessors vs microcontrollers, architectures - VonNeumann vs Harvard, CISC vs RISC, common features of microcontrollers, different types of microcontrollers. **6 hours**

UNIT II

Getting started with Arduino: Introduction to arduino, features of arduino, power supply, power connections, analog inputs, digital connections, microcontroller, other components, the arduino family, arduino IDE installation and setup, arduino sketch overview. **6 hours**

UNIT III

Arduino programming: C language basics: arduino C data types, variables, commands (condition and loop statements) - if, for, while, # define directive, functions, arrays, strings, arduino i/o functions, standard arduino library. **6 hours**

UNIT IV

Arduino interfacing: Interfacing LEDs, push buttons, buzzer, relays, displays - serial monitor, 7-segment LEDs, LCDs, sensors - temperature, humidity, ultrasonic, LDR, IR, PIR, motors - DC, servo, stepper. **9 hours**

UNIT V

Case studies: Arduino based home automation system, Solar street light system, Car parking system. **3 hours**

Text Books:

1. F. Vahid and T. Givargis, "Embedded System Design: A Unified Hardware/Software Introduction", Wiley India Pvt. Ltd., 2002.
2. Simon Monk, "Programming Arduino - Getting started with sketches", The McGraw-Hill publications, 2012.
3. Ashwin Pajankar, " Arduino made simple", BPB publications, 2018.

Reference Books and websites:

1. Massimo Banzi and Michael Shiloh " Getting started with Arduino". Shroff Publishers and Distributors Pvt. Ltd., 2015.
2. Mark Arthur, "Arduino for Beginners-A step by step ultimate guide to learn arduino programming", Mark Arthur Publication limited, 2019.
3. Michael Margolis, Brian Jepson & Nicholas Robert Weldin, "Arduino Cookbook-Recipes to Begin, Expand, and Enhance Your Projects", 3rd Edition. O'Reilly Media.
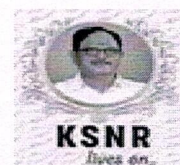4. https://www.arduino.cc/en/Tutorial/HomePage
5. https://www.arduino.cc/reference/en/
6. https://create.arduino.cc/projecthub

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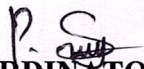### An ISO 14001:2004 & 9001: 2015 Certified Institution

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Department of Electronics & Communication Engineering

Certificate Course on "Programming with Arduino"

Schedule

S.No	Date	Time	Faculty	Topic
1	27/09/2021	4 PM to 5PM	R.V. Sreehari	Inaugration
2	28/09/2021	4 PM to 5PM	R.V. Sreehari	Introduction to an Embedded System, block diagram of an embedded system, advantages of an embedded systems
3	29/09/2021	4 PM to 5PM	R.V. Sreehari	applications of an embedded system, microprocessors vs microcontrollers
4	30/09/2021	4 PM to 5PM	R.V. Sreehari	architectures – Von Neumann vs Harvard, CISC vs RISC
5	01/10/2021	4 PM to 5PM	R.V. Sreehari	common features of microcontrollers, different types of microcontrollers
6	04/10/2021	4 PM to 5PM	R.V. Sreehari	Introduction to arduino, features of arduino
7	05/10/2021	4 PM to 5PM	R.V. Sreehari	power connections, analog inputs, digital connections
8	06/10/2021	4 PM to 5PM	R.V. Sreehari	microcontroller, other components, the arduino family
9	07/10/2021 08/10/2021	4 PM to 5PM	R.V. Sreehari	arduino IDE installation and setup, arduino sketch overview
10	16/10/2021	4 PM to 5PM	R.V. Sreehari	arduino C data types, variables,
11	18/10/2021 19/10/2021	4 PM to 5PM	R.V. Sreehari	commandsarduino i/o functions, standard arduino library
12	20/10/2021 21/10/2021	4 PM to 5PM	R.V. Sreehari	Arduino interfacing,

13	22/10/2021 23/10/2021	4 PM to 5PM	R.V. Sreehari	relays, displays - serial monitor, 7-segment LEDs
14	25/10/2021	4 PM to 5PM	R.V. Sreehari	LCDs, sensors – temperature
15	26/10/2021	4 PM to 5PM	R.V. Sreehari	LDR, IR, PIR
16	27/10/2021	4 PM to 5PM	R.V. Sreehari	Motors - DC, servo, stepper
17	28/10/2021	4 PM to 5PM	R.V. Sreehari	Arduino based home automation system
18	29/08/2021 30/10/2021	4 PM to 5PM	R.V. Sreehari	Solar street light system, Car parking system

COORDINATOR

HOD

K.S.R.M. COLLEGE OF ENGINEERING

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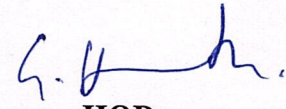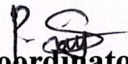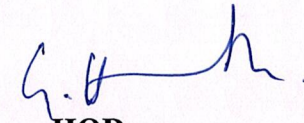**Department of Electronics & Communication Engineering**
Certificate Course on "Programming with Arduino"
Attendance Sheet

S.No	Roll No.	Name of the Student	27/09/2021	28/09/2021	29/09/2021	30/09/2021	01/10/2021	04/10/2021	05/10/2021	06/10/2021	07/10/2021	08/10/2021	16/10/2021	18/10/2021	19/10/2021	20/10/2021	21/10/2021	22/10/2021	23/10/2021	25/10/2021	26/10/2021	27/10/2021	28/10/2021	29/10/2021	30/10/2021
1	199Y1A0401	AKULA VENKATESH	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P
2	199Y1A0402	AMBATI MOULEESWARA REDDY	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
3	199Y1A0403	ANGAJALA KAVYA SREE	P	P	P	P	P	P	P	P	P	P	P	P	P	P	A	P	A	P	P	P	P	P	P
4	199Y1A0407	AYYALURI VENKATA PAVAN KUMAR REDDY	A	P	P	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P
5	199Y1A0408	BALASAMUDRAM AJAY KUMAR	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
6	199Y1A0409	BANDI SAI BALAJI	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P
7	199Y1A0411	BANDISEELA UDAYKUMAR	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	A

S.No	Roll No	Name																					
8	199Y1A0412	BARIVENKULA SREENATH	P	P	P	P	P	P	P	P	A	P	P	P	P	P	A	P	P	P	P	P	P	P
9	199Y1A0413	BINGIMALLA VENKATA THARUN KUMAR	P	P	P	P	P	A	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P
10	199Y1A0414	BOKKASAM SAI DEEPAK	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
11	199Y1A0415	BOOSI VENKATA SAINATH REDDY	P	P	P	P	P	P	A	P	P	P	A	P	P	P	P	P	P	P	P	P	P	P
12	199Y1A0417	C JASHWANTH VARMA	P	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P	P
13	199Y1A0418	CHAGANTI TEJESH KUMAR REDDY	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P
14	199Y1A0419	CHALLA STEPHEN KUMAR	P	P	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P	A	P	P
15	199Y1A0420	CHAVALI RAJESH	P	P	P	P	P	P	A	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P
16	199Y1A0421	CHAVVA SAI SUSMITHA (W)	P	P	P	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P
17	199Y1A0422	CHEEPATI VARAPRASAD REDDY	P	P	P	P	P	P	A	P	P	P	P	P	P	A	P	P	P	A	P	P	P	P
18	199Y1A0423	CHENNABOINA GURU DEEKSHITH	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P	A	P	P	A
19	199Y1A0424	CHEPPALI ANKAIAH	P	P	P	P	A	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P
20	199Y1A0425	CHERUVU SAI PRAKASH REDDY	P	P	P	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P
21	199Y1A0427	CHINNAKOTLA SAI DHEERAJ	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
22	199Y1A0428	CHINNAULA SANDEEP REDDY	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	A	A	P	P	P
23	199Y1A0430	CHINTAKUNTA VEERA SIVA	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	A	A	P	P	P	P	P
24	199Y1A0431	CHINTHALAPALLI MADHURIMA (W)	P	P	P	P	P	P	A	P	P	P	P	P	P	P	A	P	P	P	P	P	P	A
25	199Y1A0432	DANDE MOUNIKA (W)	P	P	P	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P
26	199Y1A0433	DERANGULA SAI KUMAR	P	P	P	P	P	P	P	P	A	P	P	P	P	A	P	P	P	P	P	P	P	P
27	199Y1A0436	DEVARASETTY HARIPRIYA (W)	P	P	P	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P

28	199Y1A0437	DINNEPU VIKAS BHARADWAJ REDDY	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P	A	P	P	P	P	P	P
29	199Y1A0440	GADDA UPENDRA	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P	P	P
30	199Y1A0441	GADDE ANUSHKA (W)	P	P	P	P	P	A	P	P	P	P	P	P	P	P	A	P	P	P	P	P
31	199Y1A0448	GAJJALA NAVYA TEJASREE (W)	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P	A	P	P	P	P
32	199Y1A0449	GAMPA SIVA KUMAR	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P	A	P	P
33	199Y1A0451	GANDIKOTA SWARNALATHA (W)	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
34	199Y1A0452	GANGIREDDY SAI PRAVALLIKA (W)	P	P	P	P	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P
35	199Y1A0456	GOLLA PRASANNA KUMAR	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	A	P	P	P	P
36	199Y1A0459	GOPANA VISHNUVARDHAN NAIDU	P	P	P	P	P	P	P	P	P	P	P	P	A	P	P	P	A	P	P	P
37	199Y1A0460	GOTLA YESWANTH	P	P	P	P	P	P	P	P	P	A	P	P	A	P	P	P	P	P	P	P	P
38	199Y1A0461	GOURIPEDDI K S SREEDHANYA (W)	P	P	P	A	P	P	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P
39	199Y1A0463	GULYAM SHARATH	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P
40	199Y1A0468	JANGAMSETTY VINOD	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P	P	P	P
41	199Y1A0471	KADAVAKUTI SOWMYA PRIYA (W)	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P
42	199Y1A0473	KAKARLA SAGAR	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	A	P	P	P	P
43	199Y1A0479	KAKE SAIBHARATH	P	P	P	P	A	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P
44	199Y1A0483	KALUVALA SREEVIDYA (W)	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P	A	P	P
45	199Y1A0484	KAMBAM MANOJ KUMAR	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P	P
46	199Y1A0485	KAYAM VINAY	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P	A	P	P	P	P
47	199Y1A0487	KOMPALA SAI CHARAN	P	P	P	P	A	P	P	P	P	P	P	P	P	A	P	P	P	P
48	199Y1A04E4	KONDAMUGARI EESHITHA RACHANA RAVINDRA (W)	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P	A	P	P
49	199Y1A04E5	KUNDHARAPU VENKATESH	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P	A	P	P	P	P

S.No	Roll No	Name																						
50	199Y1A04E7	KURUVA LAKSHMANNA	P	P	P	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P
51	199Y1A04E8	KURUVA SAI PRAKASH	P	P	P	P	P	P	P	P	P	P	P	P	A	P	P	P	A	P	P	P	P	P
52	199Y1A04F0	KUTEDDULA JASWANTH REDDY	P	P	P	P	P	P	P	A	P	P	P	P	P	A	P	P	P	P	P	P	P	P
53	199Y1A04F1	M SAI VARDHAN NAIDU	P	P	P	P	A	P	P	P	P	A	P	P	P	P	P	A	P	P	P	P	P	P
54	199Y1A04F3	SHAIK MOHAMMED GHOUSE	P	P	P	P	P	A	P	P	P	P	P	A	P	P	P	P	P	P	P	A	P	P

Coordinator

K.S.R.M. COLLEGE OF ENGINEERING

(UGC - Autonomous)

Kadapa, Andhra Pradesh, India - 516 003

Approved by AICTE, New Delhi & Affiliated to JNTUA, Ananthapuramu.

KSNR

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

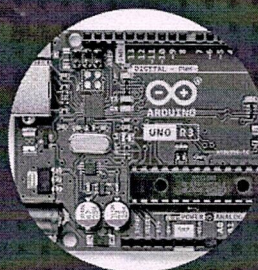## CERTIFICATE COURSE ON
Programming with Arduino

RESOURCE PERSON:

R.V. Sreehari

Associate Professor ECE Department

Date:

27th Sep to 30th Oct

Every day 4:00pm to 5:00pm
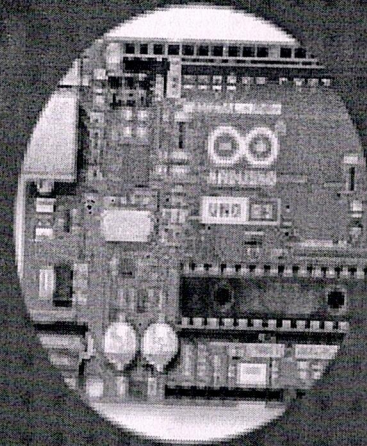
f ◉ ⦿ ✕ ▶ **ksrmceofficial**   🌐 **www.ksrmce.ac.in**   © **8143731980, 8575697569**

K.S.R.M. COLLEGE OF ENGINEERING

(AUTONOMOUS) Kadapa, Andhra Pradesh, India– 516 005
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An ISO 14001:2004 & 9001: 2015 Certified Institution

KSNR
lives on.

ACTIVITY REPORT

Certification Course

On

"Programming with Arduino"

27th September, 2021 to 30th October, 2021

Target Group	:	Students
Details of Participants	:	54 Students
Co-ordinator	:	P. Swetha, Assistant Professor ECE Department
Organizing Department	:	Department of Electronics & Communication Engineering
Venue	:	DSP Lab

Description: Certification course on "Programming with Arduino" was organized by Dept. of ECE from 27th September 2021 to 30th October 2021. R.V. Sreehari acted as Course instructors. The main aim of the course is to learn new things of the arudino C data types and Interfacing LEDs, push buttons, buzzer, relays of arduino Programming helps to understand and programme. This thirty hours course was successfully completed and participation certificates were provided to the participants.

Photos:

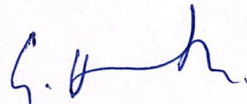

Krishnapuram, Andhra Pradesh, India
FQG8+W5F, Krishnapuram, Andhra Pradesh 516003, India
Lat 14.476583°
Long 78.765277°
28/09/21 04:58 PM

Krishnapuram, Andhra Pradesh, India
FQG8+W5F, Krishnapuram, Andhra Pradesh
516003, India
Lat 14.476545° Long 78.765278°
29/09/21 04:21 PM

32.99° C

Krishnapuram, Andhra Pradesh, India
FQG8+W5F, Krishnapuram, Andhra Pradesh
516003, India
Lat 14.476556° Long 78.765293°
29/09/21 04:23 PM

32.99° C

GPS Map Camera

HOD madam is addressing the students

Coordinators
P. Swetha

HOD

KSRM COLLEGE OF ENGINEERING

UGC – AUTONOMOUS

Approved by AICTE, New Delhi, Affiliated to JNTUA, Ananthapuramu

Kadapa, Andhra Pradesh, India - 516003

CERTIFICATE

OF PARTICIPATION

This is to certify that Mr./Ms. K. MANOJ KUMAR has completed the course on "Programming with Arduino" organized by the department of Electronics and Communication Engineering, KSRM College of Engineering from 27/09/2021 to 30/10/2021.

HOD

Dr. G. Hemalatha

Principal

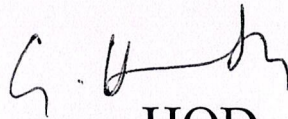Prof.V.S.S. Murthy

KSRM COLLEGE OF ENGINEERING

UGC – AUTONOMOUS

Approved by AICTE, New Delhi, Affiliated to JNTUA, Ananthapuramu
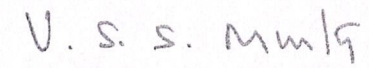
Kadapa, Andhra Pradesh, India - 516003

CERTIFICATE

OF PARTICIPATION

This is to certify that Mr./Ms. ---B. SREENATH--------- has completed the course on "Programming with Arduino" organized by the department of Electronics and Communication Engineering, KSRM College of Engineering from 27/09/2021 to 30/10/2021.

HOD

Dr. G. Hemalatha

Principal

Prof.V.S.S. Murthy

KSRM COLLEGE OF ENGINEERING

UGC – AUTONOMOUS

Approved by AICTE, New Delhi, Affiliated to JNTUA, Ananthapuramu

Kadapa, Andhra Pradesh, India - 516003

CERTIFICATE

OF PARTICIPATION

This is to certify that Mr./Ms. G.NAVYA TEJASREE has completed the course on "Programming with Arduino" organized by the department of Electronics and Communication Engineering, KSRM College of Engineering from 27/09/2021 to 30/10/2021.

HOD

Dr. G. Hemalatha

Principal

Prof.V.S.S. Murthy

Feedback form on Certificate Course

Programming with Arduino(28/09/0021 to 30/10/2021)

1. Roll Number *

   _____

2. Name of the Student *

   _____

3. *

   Mark only one oval.

   ◯ I SEM

   ◯ II SEM

   ◯ III SEM

   ◯ ``

   ◯ V SEM

   ◯ VI SEM

   ◯ VII SEM

   ◯ VIII SEM

4. Branch *

Mark only one oval.

- ◯ Civil Enginerring
- ◯ EEE
- ◯ ME
- ◯ ECE
- ◯ CSE
- ◯ AI&ML

5. Email ID *

_____

6. Is the course content meet your exceptation. *

Mark only one oval.

- ◯ Yes
- ◯ No

7. Is the lecture sequence well planned. *

Mark only one oval.

- ◯ Strongly disagree
- ◯ Disagree
- ◯ Neutral
- ◯ Agree
- ◯ Strongly agree

8. The contents of the course is explained with examples. *

Mark only one oval.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

9. Is the level of course high. *

Mark only one oval.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

10. Is the course exposed you to the new knowledge and practice. *

Mark only one oval.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

11. Is the lecture clear and easy to understand. *

   Mark only one oval.

   - ( ) Strongly disagree
   - ( ) Disagree
   - ( ) Neutral
   - ( ) Agree
   - ( ) Strongly agree

12. Rate the value of the course increasing your skills. *

   Mark only one oval.

   - ( ) Strongly disagree
   - ( ) Disagree
   - ( ) Neutral
   - ( ) Agree
   - ( ) Strongly Agree

13. Any suggestions

   _____

   _____

   _____

   _____

   _____

K.S.R.M. COLLEGE OF ENGINEERING
(UGC) AUTONOMOUS

Kadapa, Andhra Pradesh, India - 516
Approved by AICTE, New Delhi & Affiliated to JNTUA,   nu.
Department of Electronics and Communication Engineering
Feedback Form

S.No.	Email address	Name of the student	Year & Semester	Branch	Roll No.	Is the course content met your expectation	Is the lecture sequence well planned	The contents of the course is explained with examples	Is the level of course high	Is the course exposed you to the new knowledge and practices	Is the lecturer clear and easy to understand	Rate the value of course in increasing your skills	Any issues
1	199Y1A0401@ksrmce.ac.in	AKULA VENKATESH	B.Tech V sem	ECE	199Y1A0401	Yes	Yes	Agree	Agree	Strongly agree	4	5	Nothing
2	199Y1A0402@ksrmce.ac.in	AMBATI MOULEESWARA REDDY	B.Tech V sem	ECE	199Y1A0402	Yes	Yes	Agree	Agree	Strongly agree	5	5	Nothing
3	199Y1A0403@ksrmce.ac.in	ANGAJALA KAVYA SREE	B.Tech V sem	ECE	199Y1A0403	Yes	Yes	Agree	Agree	Strongly agree	4	5	Good
4	199Y1A0407@ksrmce.ac.in	AYYALURI VENKATA PAVAN KUMAR	B.Tech V sem	ECE	199Y1A0407	Yes	Yes	Agree	Agree	Strongly agree	5	5	nothing
5	199Y1A408@ksrmce.ac.in	BALASAMUDRA M AJAY KUMAR	B.Tech V sem	ECE	199Y1A0408	Yes	Yes	Agree	Agree	Strongly agree	5	5	Good
6	199Y1A0409@ksrmce.ac.in	BANDI SAI BALAJI	B.Tech V sem	ECE	199Y1A0409	Yes	Yes	Agree	Agree	Strongly agree	4	5	very good
7	199Y1A0411@ksrmce.ac.in	BANDISEELA UDAYKUMAR	B.Tech V sem	ECE	199Y1A0411	Yes	Yes	Strongly agree	Agree	Strongly agree	4	3	Nothing
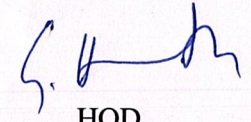
8	199Y1A0412@ksrmce.ac.in	BARIVENKULA SREENATH	B.Tech V sem	ECE	199Y1A0412	Yes	Yes	agree	Agree	Strongly agree	4	4	no
9	199Y1A0413@ksrmce.ac.in	BINGIMALLA VENKATA THARUN	B.Tech V sem	ECE	199Y1A0413	Yes	Yes	Strongly agree	Agree	Strongly agree	5	5	Nothing
10	199Y1A0414@ksrmce.ac.in	BOKKASAM SAI DEEPAK	B.Tech V sem	ECE	199Y1A0414	Yes	Yes	Strongly agree	Agree	Strongly agree	5	5	Good
11	199Y1A0415@ksrmce.ac.in	BOOSI VENKATA SAINATH	B.Tech V sem	ECE	199Y1A0415	Yes	Yes	Agree	Agree	Strongly agree	5	4	Good
12	199Y1A0417@ksrmce.ac.in	C JASHWANTH VARMA	B.Tech V sem	ECE	199Y1A0417	Yes	Yes	agree	Agree	Strongly agree	5	5	Good
13	199Y1A0418@ksrmce.ac.in	CHAGANTI TEJESH KUMAR REDDY	B.Tech V sem	ECE	199Y1A0418	Yes	Yes	agree	Agree	Strongly agree	3	5	Good
14	199Y1A0419@ksrmce.ac.in	CHALLA STEPHEN KUMAR	B.Tech V sem	ECE	199Y1A0419	Yes	Yes	agree	Agree	Strongly agree	5	4	very good
15	199Y1A0420@ksrmce.ac.in	CHAVALI RAJESH	B.Tech V sem	ECE	199Y1A0420	Yes	Yes	agree	Agree	Strongly agree	4	4	very good
16	199Y1A0421@ksrmce.ac.in	CHAVVA SAI SUSMITHA (W)	B.Tech V sem	ECE	199Y1A0421	Yes	Yes	agree	Agree	Strongly agree	5	4	very good
17	199Y1A0422@ksrmce.ac.in	CHEEPATI VARAPRASAD REDDY	B.Tech V sem	ECE	199Y1A0422	Yes	Yes	agree	Agree	Strongly agree	3	5	no
18	199Y1A0423@ksrmce.ac.in	CHENNABOINA GURU DEEKSHITH	B.Tech V sem	ECE	199Y1A0423	Yes	Yes	agree	Agree	Strongly agree	4	5	nithing
19	199Y1A0424@ksrmce.ac.in	CHEPPALI ANKAIAH	B.Tech V sem	ECE	199Y1A0424	Yes	Yes	Strongly agree	Agree	Strongly agree	4	5	Good
20	199Y1A0425@ksrmce.ac.in	CHERUVU SAI PRAKASH REDDY	B.Tech V sem	ECE	199Y1A0425	Yes	Yes	Strongly agree	Agree	Strongly agree	4	4	Good
21	199Y1A0427@ksrmce.ac.in	CHINNAKOTLA SAI DHEERAJ	B.Tech V sem	ECE	199Y1A0427	Yes	Yes	Strongly agree	Agree	Strongly agree	4	3	Good
22	199Y1A0428@ksrmce.ac.in	CHINNAULA SANDEEP REDDY	B.Tech V sem	ECE	199Y1A0428	Yes	Yes	agree	Agree	Strongly agree	4	4	Good
23	199Y1A0430@ksrmce.ac.in	CHINTAKUNTA VEERA SIVA	B.Tech V sem	ECE	199Y1A0430	Yes	Yes	agree	Agree	Strongly agree	5	4	Good

24	199Y1A0431@ksrmce.ac.in	CHINTHALAPALLI MADHURIMA (W)	B.Tech V sem	ECE	199Y1A0431	Yes	Yes	Strongly agree	Agree	Strongly agree	5	4	Good
25	199Y1A0432@ksrmce.ac.in	DANDE MOUNIKA (W)	B.Tech V sem	ECE	199Y1A0432	Yes	Yes	agree	Agree	Strongly agree	5	5	Good
26	199Y1A0433@ksrmce.ac.in	DERANGULA SAI KUMAR	B.Tech V sem	ECE	199Y1A0433	Yes	Yes	agree	Agree	Strongly agree	5	5	Nothing
27	199Y1A0436@ksrmce.ac.in	DEVARASETTY HARIPRIYA (W)	B.Tech V sem	ECE	199Y1A0436	Yes	Yes	agree	Agree	Strongly agree	5	5	no
28	199Y1A0437@ksrmce.ac.in	DINNEPU VIKAS BHARADWAJ REDDY	B.Tech V sem	ECE	199Y1A0437	Yes	Yes	agree	Agree	Strongly agree	3	4	no
29	199Y1A0440@ksrmce.ac.in	GADDA UPENDRA	B.Tech V sem	ECE	199Y1A0440	Yes	Yes	Strongly agree	Agree	Strongly agree	3	4	no
30	199Y1A0441@ksrmce.ac.in	GADDE ANUSHKA (W)	B.Tech V sem	ECE	199Y1A0441	Yes	Yes	Strongly agree	Agree	Strongly agree		5	no
31	199Y1A0448@ksrmce.ac.in	GOLLA PRASANNA KUMAR	B.Tech V sem	ECE	199Y1A0448	Yes	Yes	agree	Agree	Strongly agree	5	4	Good
32	199Y1A0449@ksrmce.ac.in	GOPANA VISHNUVARDHAN NAIDU	B.Tech V sem	ECE	199Y1A0449	Yes	Yes	agree	Agree	Strongly agree	5	5	Good
33	199Y1A0451@ksrmce.ac.in	GOURIPEDDI K S SREEDHANYA (W)	B.Tech V sem	ECE	199Y1A0451	Yes	Yes	Strongly agree	Agree	Strongly agree	5	5	Good
34	199Y1A0452@ksrmce.ac.in	GULYAM SHARATH	B.Tech V sem	ECE	199Y1A0452	Yes	Yes	Strongly agree	Agree	Strongly agree	5	5	Good
35	199Y1A0456@ksrmce.ac.in	JANGAMSETTY VINOD	B.Tech V sem	ECE	199Y1A0456	Yes	Yes	Strongly agree	Agree	Strongly agree	5	5	Good
36	199Y1A0459@ksrmce.ac.in	KADAVAKUTI SOWMYA PRIYA (W)	B.Tech V sem	ECE	199Y1A0459	Yes	Yes	agree	Agree	Strongly agree	4	4	Good
37	199Y1A0460@ksrmce.ac.in	KAKARLA SAGAR	B.Tech V sem	ECE	199Y1A0460	Yes	Yes	agree	Agree	Strongly agree	4	5	Good
38	199Y1A0461@ksrmce.ac.in	KAKE SAIBHARATH	B.Tech V sem	ECE	199Y1A0461	Yes	Yes	agree	Agree	Strongly agree	4	5	Good

39	199YIA0463@ksrmce.ac.in	KALUVALA SREEVIDYA (W)	B.Tech V sem	ECE	199Y1A0463	Yes	Yes	agree	Agree	Strongly agree	3	5	Good
40	199Y1A0468@ksrmce.ac.in	KAYAM VINAY	B.Tech V sem	ECE	199Y1A0468	Yes	Yes	Strongly agree	Agree	Strongly agree	2	5	Nothing
41	199Y1A0471@ksrmce.ac.in	KOMPALA SAI CHARAN	B.Tech V sem	ECE	199Y1A0471	Yes	Yes	agree	Agree	Strongly agree	2	5	very good
42	199Y1A0473@ksrmce.ac.in	KONDAMUGARI EESHITHA RACHANA	B.Tech V sem	ECE	199Y1A0473	Yes	Yes	agree	Agree	Strongly agree	4	5	very good
43	199Y1A0479@ksrmce.ac.in	KUNDHARAPU VENKATESH	B.Tech V sem	ECE	199Y1A0479	Yes	Yes	Strongly agree	Agree	Strongly agree	5	5	very good
44	199Y1A0483@ksrmce.ac.in	KURUVA LAKSHMANNA	B.Tech V sem	ECE	199Y1A0483	Yes	Yes	Strongly agree	Agree	Strongly agree	4	5	nothing
45	199Y1A0484@ksrmce.ac.in	KURUVA SAI PRAKASH	B.Tech V sem	ECE	199Y1A0484	Yes	Yes	agree	Agree	Strongly agree	4	5	Good
46	199Y1A0485@ksrmce.ac.in	KUTEDDULA JASWANTH REDDY	B.Tech V sem	ECE	199Y1A0485	Yes	Yes	agree	Agree	Strongly agree	4	5	Good
47	199Y1A0487@ksrmce.ac.in	M SAI VARDHAN NAIDU	B.Tech V sem	ECE	199Y1A0487	Yes	Yes	agree	Agree	Strongly agree	4	5	nothing
48	199Y1A04E4@ksrmce.ac.in	SHAIK MOHAMMED YASEEN	B.Tech V sem	ECE	199Y1A04E4	Yes	Yes	agree	Agree	Strongly agree	4	5	nothing
49	199Y1A04E5@ksrmce.ac.in	SHAIK MUNAZZAH FATIMA (W)	B.Tech V sem	ECE	199Y1A04E5	Yes	Yes	agree	Agree	Strongly agree	4	5	Good
50	199Y1A04E7@ksrmce.ac.in	SHAIK RUMMESA KOUSAR (W)	B.Tech V sem	ECE	199Y1A04E7	Yes	Yes	agree	Agree	Strongly agree	5	5	very good
51	199Y1A04E8@ksrmce.ac.in	SHAIK SADAK ALI	B.Tech V sem	ECE	199Y1A04E8	Yes	Yes	Strongly agree	Agree	Strongly agree	5	5	very good
52	199Y1A04F0@ksrmce.ac.in	SIDDAVATAM SUDHARSHAN	B.Tech V sem	ECE	199Y1A04F0	Yes	Yes	agree	Agree	Strongly agree	5	5	no
53	199Y1A04F1@ksrmce.ac.in	SIKILIGIRI SAMEER AHAMMAD	B.Tech V sem	ECE	199Y1A04F1	Yes	Yes	agree	Agree	Strongly agree	5	5	Nothing

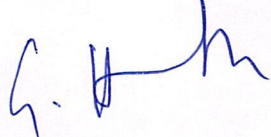| 54 | 199Y1A04F3@ksrmce.ac.in | SREERAMADASU VENKATA NAGA SAI | B.Tech V sem | ECE | 199Y1A04F3 | Yes | Yes | agree | Agree | Strongly agree | 3 | 4 | no |

Coordinator

HOD

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA-516003
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
VALUE ADDED/CERTIFICATE COURSE ON
PROGRAMMING WITH ARDUINO FROM 28/09/2021 to 30/10/2021
AWARD LIST

S.No	Roll Number	Name of the Student	Marks Obtained
1.	199Y1A0401	AKULA VENKATESH	13
2.	199Y1A0402	AMBATI MOULEESWARA REDDY	12
3.	199Y1A0403	ANGAJALA KAVYA SREE	15
4.	199Y1A0407	AYYALURI VENKATA PAVAN KUMAR REDDY	16
5.	199Y1A0408	BALASAMUDRAM AJAY KUMAR	13
6.	199Y1A0409	BANDI SAI BALAJI	14
7.	199Y1A0411	BANDISEELA UDAYKUMAR	15
8.	199Y1A0412	BARIVENKULA SREENATH	16
9.	199Y1A0413	BINGIMALLA VENKATA THARUN KUMAR	11
10.	199Y1A0414	BOKKASAM SAI DEEPAK	11
11.	199Y1A0415	BOOSI VENKATA SAINATH REDDY	12
12.	199Y1A0417	C JASHWANTH VARMA	13
13.	199Y1A0418	CHAGANTI TEJESH KUMAR REDDY	06
14.	199Y1A0419	CHALLA STEPHEN KUMAR	09
15.	199Y1A0420	CHAVALI RAJESH	15
16.	199Y1A0421	CHAVVA SAI SUSMITHA	15
17.	199Y1A0422	CHEEPATI VARAPRASAD REDDY	14
18.	199Y1A0423	CHENNABOINA GURU DEEKSHITH	13
19.	199Y1A0424	CHEPPALI ANKAIAH	12
20.	199Y1A0425	CHERUVU SAI PRAKASH REDDY	12

21.	199Y1A0427	CHINNAKOTLA SAI DHEERAJ	13
22.	199Y1A0428	CHINNAULA SANDEEP REDDY	12
23.	199Y1A0430	CHINTAKUNTA VEERA SIVA	14
24.	199Y1A0431	CHINTHALAPALLI MADHURIMA	14
25.	199Y1A0432	DANDE MOUNIKA	15
26.	199Y1A0433	DERANGULA SAI KUMAR	16
27.	199Y1A0436	DEVARASETTY HARIPRIYA	14
28.	199Y1A0437	DINNEPU VIKAS BHARADWAJ REDDY	13
29.	199Y1A0440	GADDA UPENDRA	11
30.	199Y1A0441	GADDE ANUSHKA (W)	12
31.	199Y1A0448	GOLLA PRASANNA KUMAR	14
32.	199Y1A0449	GOPANA VISHNUVARDHAN NAIDU	12
33.	199Y1A0451	GOURIPEDDI K S SREEDHANYA	11
34.	199Y1A0452	GULYAM SHARATH	15
35.	199Y1A0456	JANGAMSETTY VINOD	16
36.	199Y1A0459	KADAVAKUTI SOWMYA PRIYA	10
37.	199Y1A0460	KAKARLA SAGAR	05
38.	199Y1A0461	KAKE SAIBHARATH	12
39.	199Y1A0463	KALUVALA SREEVIDYA	13
40.	199Y1A0468	KAYAM VINAY	15
41.	199Y1A0471	KOMPALA SAI CHARAN	13
42.	199Y1A0473	KONDAMUGARI EESHITHA RACHANA RAVINDRA	11
43.	199Y1A0479	KUNDHARAPU VENKATESH	12

44.	199Y1A0483	KURUVA LAKSHMANNA	13
45.	199Y1A0484	KURUVA SAI PRAKASH	13
46.	199Y1A0485	KUTEDDULA JASWANTH REDDY	11
47.	199Y1A0487	M SAI VARDHAN NAIDU	12
48.	199Y1A04E4	SHAIK MOHAMMED YASEEN	11
49.	199Y1A04E5	SHAIK MUNAZZAH FATIMA	13
50.	199Y1A04E7	SHAIK RUMMESA KOUSAR	12
51.	199Y1A04E8	S. SADAK ALI	14
52.	199Y1A04F0	SIDDAVATAM SUDHARSHAN	13
53.	199Y1A04F1	SIKILIGIRI SAMEER AHAMMAD	15
54	199Y1A04F3	SREERAMADASU VENKATA NAGA SAI	16

Coordinator

HoD

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA-516003
DEPARTMENT OF ELECTRONICS AND COMMUNICATIONS OF ENGINEERING
VALUE ADDED /CERTIFICATE COURSE ON
PROGRAMMING WITH ARDUINO FROM 28/09/2021 to 30/10/2021
ASSESSMENT TEST

Roll Number: _____ **Name of the Student:** _____

Time: 20 Min (Objective Questions) **Max.Marks: 20**

Note: Answer the following Questions and each question carries **one** mark.

1. Arduino is an open-source technology which is used to assemble _____ blueprints.   [   ]
    a) Electrical   b) Chemical   c) Electronic   d) Disclaimer

2. Arduino has both software and _____ board   [   ]
    a)Timing circuit b) Break the circuit c) Programmable circuit d) Feedback circuit

3. The Arduino board is also called a _____?   [   ]
    a)Microprocessor b) Timer   c) Oscillator d) Microcontroller

4. Code writing and uploading into the board is done using _____?   [   ]
    a)Environment   b) PC c) IDE   d) SOME

5. _____ is the language used by the Arduino IDE to code easily.   [   ]
    a)C   b) C++   c) Java   d) Python

6. Arduino doesn't require separate _____ to load code on the board.   [   ]
    a)Storing b) Programmers   c) Initializer d) Oscillator

7. _____ is the best product in the Arduino family for Beginners.   [   ]
    a)Divide b) Uno   c) Thrive   d) None of the above

8. Expand the full form of USB is_____?   [   ]
    a) United Serial Bus   b) Universal Serial Bus
    c) United Search Bus   d) None of the above

9. If the voltage is greater than _____, then the Arduino will destroy   [   ]
    a) 10   b) 30   c)20   d) 05

10. Approved voltage for Arduino types are _____ volts.   [   ]
    a) 3 and 5   b) 5 and 10   c)6 and 12   d) None of the above

11. To ground the circuit _____ pin is used in Arduino.   [   ]
    a) PIN   b) GND   c) RESET   d) None of the above

12. The 5V pin of Arduino supplies _____ volts of power.   [   ]
    a) 2.5   b) 10   c) 5   d) 0

13. How many Analog pins exist in Arduino?   [   ]

    a) 9   b) 5   c) 6   d) 10

14. Analog pins _____ the signals from an analog sensor.   [   ]

    a) Write   b) Read   c) Peruse   d) Study

15. The 3.3V pin of Arduino supplies _____ volts of power.   [   ]

    a)3.5   b) 10   c) 5   d) 3.3

16. After conversion from analog to digital value is read by _____?   [   ]

    a) Temperature sensor   b) Oscillator   c) Wavelet   d) Timers

17. _____ pins are known as digital pins in Arduino.   [   ]

    a) 10   b) 11   c) 12   d) 13

18. Expand PWM full form _____?   [   ]

    a) Pulse Width Modulation.   b) Pulse Wide Modulation

    c) Plain width modulation   d) None of these

19. Expand AREF full form _____?   [   ]

    a) Analog Revalue   b) Analog reference   c) Annuity reference

    d) Amplified reference

20. TX pin represents _____ in Arduino board.   [   ]

    a) Transmits   b) Receives   c) Ground   d) Restarts

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ASSESSMENT TEST

Roll Number: 19941A0412   Name of the Student: B-sree nath

Time: 20 Min   (Objective Questions)   Max.Marks: 20

Note: Answer the following Questions and each question carries **one** mark.

1. Arduino is an open-source technology which is used to assemble _____ blueprints.   [C]
    a) Electrical   b) Chemical   c) Electronic   d) Disclaimer

2. Arduino has both software and _____ board   [B]
    a)Timing circuit   b) Break the circuit   c) Programmable circuit   d) Feedback circuit

3. The Arduino board is also called a _____ ?   [D]
    a)Microprocessor   b) Timer   c) Oscillator   d) Microcontroller

4. Code writing and uploading into the board is done using _____ ?   [C]
    a)Environment   b) PC   c) IDE   d) SOME

5. _____ is the language used by the Arduino IDE to code easily.   [A]
    a)C   b) C++   c) Java   d) Python

6. Arduino doesn't require separate _____ to load code on the board.   [B]
    a)Storing   b) Programmers   c) Initializer   d) Oscillator

7. _____ is the best product in the Arduino family for Beginners.   [B]
    a)Divide   b) Uno   c) Thrive   d) None of the above

8. Expand the full form of USB is_____ ?   [C]
    a) United Serial Bus   b) Universal Serial Bus
    c) United Search Bus   d) None of the above

9. If the voltage is greater than _____, then the Arduino will destroy   [A]
    a) 10   b) 30   c)20   d) 05

10. Approved voltage for Arduino types are _____ volts.   [C]
    a) 3 and 5   b) 5 and 10   c)6 and 12   d) None of the above

11. To ground the circuit _____ pin is used in Arduino.   [B]
    a) PIN   b) GND   c) RESET   d) None of the above

12. The 5V pin of Arduino supplies _____ volts of power.   [C]
    a) 2.5   b) 10   c) 5   d) 0

13. How many Analog pins exist in Arduino? [A]

    a) 9   b) 5   c) 6   d) 10

14. Analog pins _____ the signals from an analog sensor. [B]

    a) Write   b) Read   c) Peruse   d) Study

15. The 3.3V pin of Arduino supplies _____ volts of power. [D]

    a)3.5   b) 10   c) 5   d) 3.3

16. After conversion from analog to digital value is read by _____? [A]

    a) Temperature sensor   b) Oscillator   c) Wavelet   d) Timers

17. _____ pins are known as digital pins in Arduino. [D]

    a) 10   b) 11   c) 12   d) 13

18. Expand PWM full form _____? [A]

    a) Pulse Width Modulation.   b) Pulse Wide Modulation

    c) Plain width modulation   d) None of these

19. Expand AREF full form _____? [B]

    a) Analog Revalue   b) Analog reference   c) Annuity reference

    d) Amplified reference

20. TX pin represents _____ in Arduino board. (C)

    a) Transmits   b) Receives   c) Ground   d) Restarts

Roll Number: 19941A0419 Name of the Student: C. Stephen Kumar

**Time: 20 Min**   (Objective Questions)   **Max.Marks: 20**

Note: Answer the following Questions and each question carries **one** mark.

1. Arduino is an open-source technology which is used to assemble _____ blueprints.   [C]
   a) Electrical   b) Chemical   c) Electronic   d) Disclaimer

2. Arduino has both software and _____ board   [B]
   a)Timing circuit b) Break the circuit c) Programmable circuit d) Feedback circuit

3. The Arduino board is also called a _____?   [D]
   a)Microprocessor b) Timer   c) Oscillator d) Microcontroller

4. Code writing and uploading into the board is done using _____?   [C]
   a)Environment   b) PC c) IDE   d) SOME

5. _____ is the language used by the Arduino IDE to code easily.   [A]
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6. Arduino doesn't require separate _____ to load code on the board.   [B]
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8. Expand the full form of USB is_____?   [C]
   a) United Serial Bus   b) Universal Serial Bus
   c) United Search Bus   d) None of the above

9. If the voltage is greater than _____, then the Arduino will destroy   [A]
   a) 10   b) 30   c)20   d) 05

10. Approved voltage for Arduino types are _____ volts.   [C]
    a) 3 and 5   b) 5 and 10   c)6 and 12   d) None of the above

11. To ground the circuit _____ pin is used in Arduino.   [B]
    a) PIN   b) GND   c) RESET   d) None of the above

12. The 5V pin of Arduino supplies _____ volts of power.   [C]
   a) 2.5   b) 10   c) 5   d) 0

13. How many Analog pins exist in Arduino?   [C]

    a) 9   b) 5   c) 6   d) 10

14. Analog pins _____ the signals from an analog sensor.   [A]

    a) Write   b) Read   c) Peruse   d) Study

15. The 3.3V pin of Arduino supplies _____ volts of power.   [B]

    a)3.5   b) 10   c) 5   d) 3.3

16. After conversion from analog to digital value is read by _____?   [C]

    a) Temperature sensor   b) Oscillator   c) Wavelet   d) Timers

17. _____ pins are known as digital pins in Arduino.   [A]

    a) 10   b) 11   c) 12   d) 13

18. Expand PWM full form _____?   [B]

    a) Pulse Width Modulation.   b) Pulse Wide Modulation

    c) Plain width modulation   d) None of these

19. Expand AREF full form _____?   [C]

    a) Analog Revalue   b) Analog reference   c) Annuity reference

    d) Amplified reference

20. TX pin represents _____ in Arduino board.   [D]

    a) Transmits   b) Receives   c) Ground   d) Restarts

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ASSESSMENT TEST

Roll Number: 19941A04F1 **Name of the Student:** S. Sameer Abammad.

Time: 20 Min   **(Objective Questions)**   **Max.Marks: 20**

Note: Answer the following Questions and each question carries **one** mark.

1. Arduino is an open-source technology which is used to assemble _____
   blueprints.   [C]
   a) Electrical   b) Chemical   c) Electronic   d) Disclaimer

2. Arduino has both software and _____ board   [B]
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9. If the voltage is greater than _____, then the Arduino will destroy   [A]

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12. The 5V pin of Arduino supplies _____ volts of power.   [C]
    a) 2.5   b) 10   c) 5   d) 0

13. How many Analog pins exist in Arduino?   [A]

    a) 9   b) 5   c) 6   d) 10

14. Analog pins _____ the signals from an analog sensor.   [D]

    a) Write   b) Read   c) Peruse   d) Study

15. The 3.3V pin of Arduino supplies _____ volts of power.   [D]

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20. TX pin represents _____ in Arduino board.   [C]

    a) Transmits   b) Receives   c) Ground   d) Restarts

Arduino board
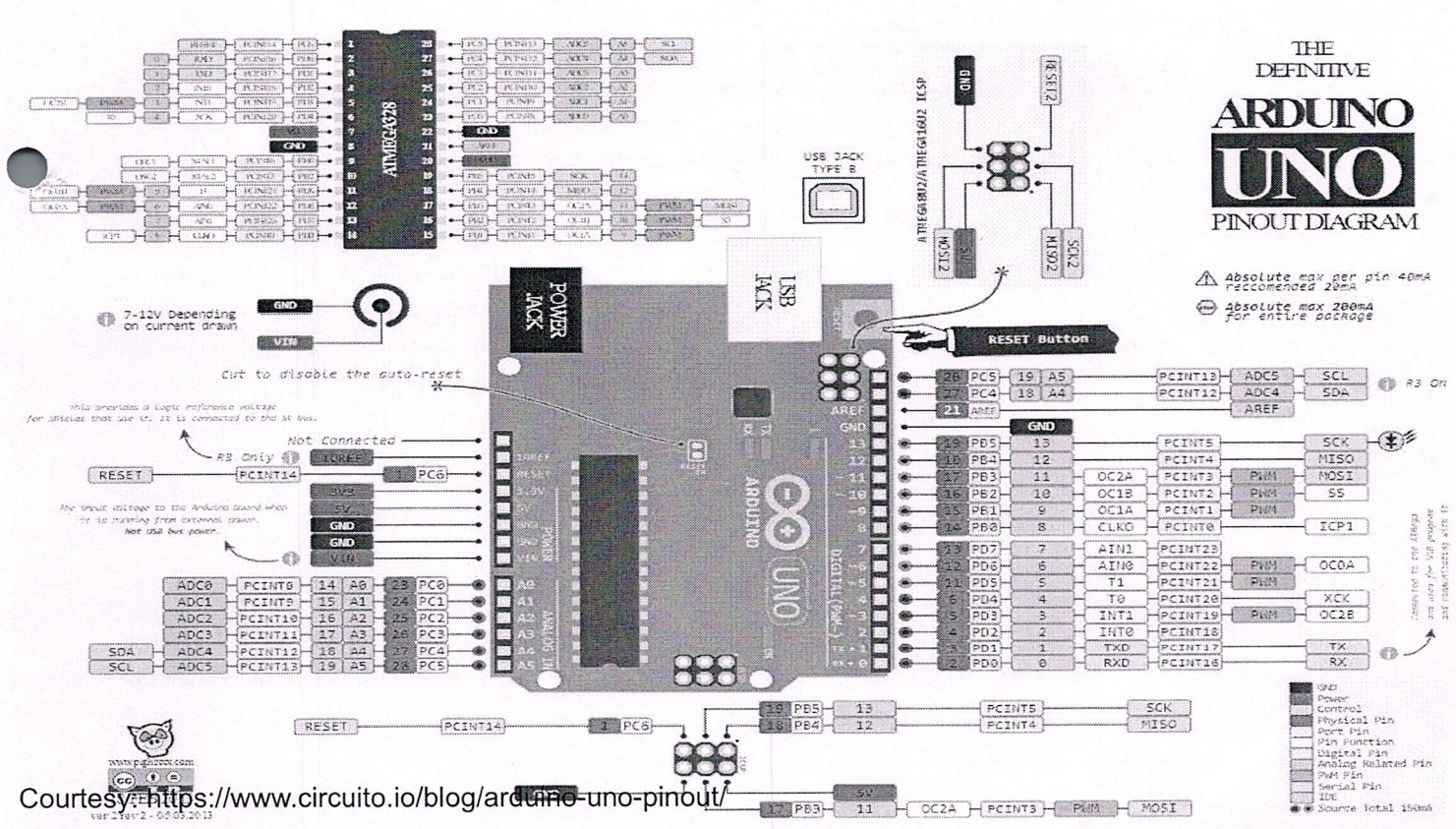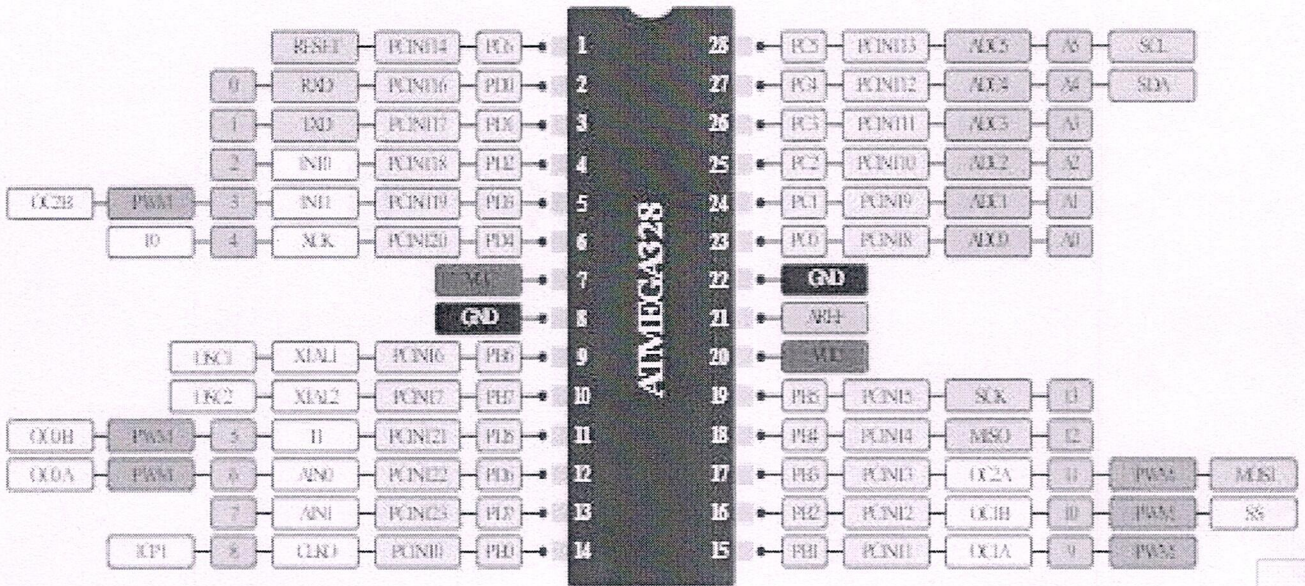
ATMEGA328P Pinout

ATMEGA328P PIN DETAILS WITH ARDUINO FUNCTIONS

ARDUINO PINS							ARDUINO PINS
Reset	(PCINT14/RESET)	PC6	Pin1	Pin28	PC5	(ADC5/SCL/PCINT13)	Analog Input 5
Digital Pin 0 (RX)	(PCINT16/RXD)	PD0	Pin2	Pin27	PD4	(ADC4/SDA/PCINT12)	Analog Input 4
Digital Pin 1 (RX)	(PCINT17/TXD)	PD1	Pin3	Pin26	PD3	(ADC3/PCINT11)	Analog Input 3
Digital Pin 2	(PCINT18/INT0)	PD2	Pin4	Pin25	PC2	(ADC2/PCINT10)	Analog Input 2
Digital Pin 3 (PWM)	(PCINT19/OC2B/INT1)	PD3	Pin5	Pin24	PC1	(ADC1/PCINT9)	Analog Input 1
Digital Pin 4		PD4	Pin6	Pin23	PC0	(ADC0/PCINT8)	Analog Input 0
Vcc		Vcc	Pin7	Pin22	GND		GND
GND		GND	Pin8	Pin21	AREF		Analog Reference
Crystal	(PCINT6/XTAL1/TOSC1)	PB6	Pin9	Pin20	AVCC		Vcc
Crystal	(PCINT7/XTAL2/TOSC2)	PB7	Pin10	Pin19	PB5	(SCK/PCINT5)	Digital Pin 13
Digital Pin 5 (PWM)	(PCINT21/OC0B/T1)	PD5	Pin11	Pin18	PB4	(MISO/PCINT4)	Digital Pin 12
Digital Pin 6 (PWM)	(PCINT22/OC0A/AIN0)	PD6	Pin12	Pin17	PB3	(MOSI/OC2A/PCINT3)	Digital Pin 11(PWM)
Digital Pin 7	(PCINT23/AIN1)	PD7	Pin13	Pin16	PB2	(SS/OC1B/PCINT2)	Digital Pin 10(PWM)
Digital Pin 8	(PCINT0/CLKO/ICP1)	PB0	Pin14	Pin15	PB1	(OC1A/PCINT1)	Digital Pin 9(PWM)

Pin diagram
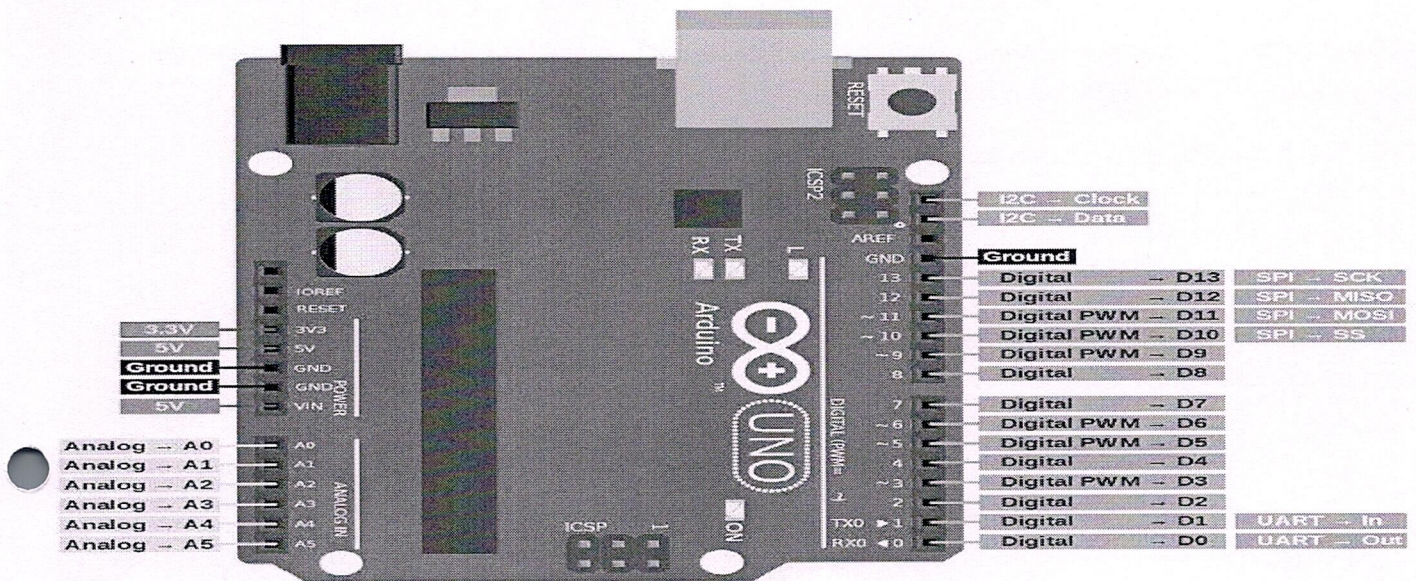
Analog Pins: The pins A0 to A5 are used as an analog input and it is in the range of 0-5V.

Digital Pins: The pins 0 to 13 are used as a digital input or output for the Arduino board.

Serial Pins: These pins are also known as a UART pin. It is used for communication between the Arduino board and a computer or other devices. The transmitter pin number 1 and receiver pin number 0 is used to transmit and receive the data respectively.

External Interrupt Pins: This pin of the Arduino board is used to produce the External interrupt and it is done by pin numbers 2 and 3.

PWM Pins: This pins of the board is used to convert the digital signal into an analog by varying the width of the Pulse. The pin numbers 3,5,6,9,10 and 11 are used as a PWM pin.

LED Pin: The board has an inbuilt LED using digital pin-13. The LED glows only when the digital pin becomes high.

SPI Pins: This is the Serial Peripheral Interface pin, it is used to maintain SPI communication with the help of the SPI library. SPI pins include:

1. SS: Pin number 10 is used as a Slave Select
2. MOSI: Pin number 11 is used as a Master Out Slave In
3. MISO: Pin number 12 is used as a Master In Slave Out
4. SCK: Pin number 13 is used as a Serial Clock

AREF Pin: This is an analog reference pin of the Arduino board. It is used to provide a reference voltage from an external power supply.

Vin: This is the input voltage pin of the Arduino board used to provide input supply from an external power source.

5V: This pin of the Arduino board is used as a regulated power supply voltage and it is used to give supply to the board as well as onboard components.

3.3V: This pin of the board is used to provide a supply of 3.3V which is generated from a voltage regulator on the board

GND: This pin of the board is used to ground the Arduino board.

Reset: This pin of the board is used to reset the microcontroller. It is used to Resets the microcontroller.

Arduino Uno pinout - Power Supply

There are 3 ways to power the Arduino Uno:

➢ **Barrel Jack** - The Barrel jack, or DC Power Jack can be used to power your Arduino board. The barrel jack is usually connected to a wall adapter. The board can be powered by 5-20 volts but the manufacturer recommends to keep it between 7-12 volts. Above 12 volts, the regulators might overheat, and below 7 volts, might not suffice.

➢ **VIN Pin** - This pin is used to power the Arduino Uno board using an external power source. The voltage should be within the range mentioned above.

➢ **USB cable** - when connected to the computer, provides 5 volts at 500mA.

Courtesy: https://www.circuito.io/blog/arduino-uno-pinout/
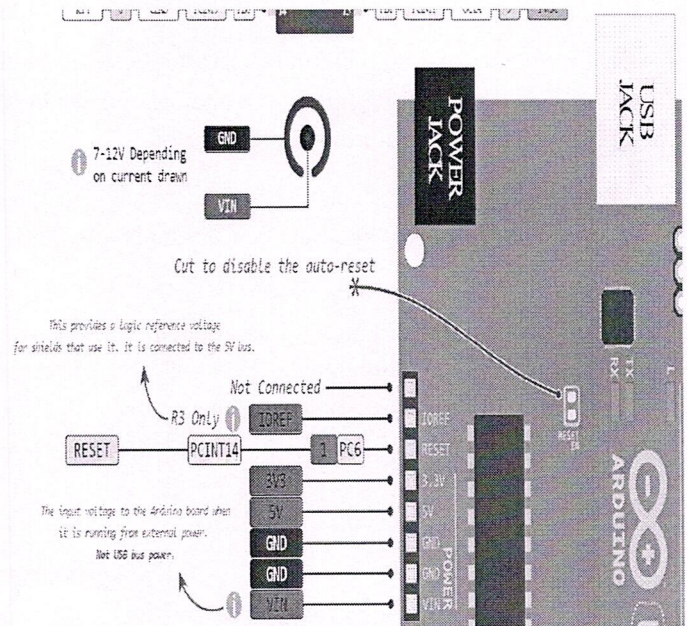
Arduino Uno Pinout - Analog IN

The Arduino Uno has 6 **analog pins**, which utilize ADC (Analog to Digital converter).

These pins serve as analog inputs but can also function as digital inputs or digital outputs.

Courtesy: https://www.circuito.io/blog/arduino-uno-pinout/
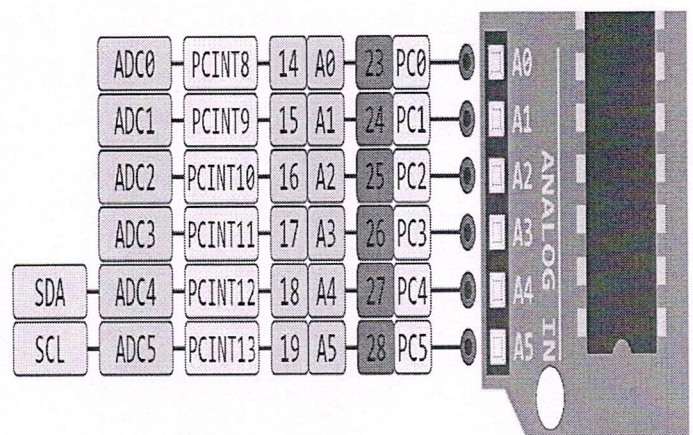
Analog to Digital Conversion

ADC stands for Analog to Digital Converter. ADC is an electronic circuit used to convert analog signals into digital signals. This digital representation of analog signals allows the processor (which is a digital device) to measure the analog signal and use it through its operation.

Arduino Pins A0-A5 are capable of reading analog voltages. On Arduino the ADC has 10-bit resolution, meaning it can represent analog voltage by 1,024 digital levels. The ADC converts voltage into bits which the microprocessor can understand.

One common example of an ADC is Voice over IP (VoIP). Every smartphone has a microphone that converts sound waves (voice) into analog voltage. This goes through the device's ADC, gets converted into digital data, which is transmitted to the receiving side over the internet.

Courtesy: https://www.circuito.io/blog/arduino-uno-pinout/

Arduino Uno Pinout - Digital Pins

Pins 0-13 of the Arduino Uno serve as digital input/output pins.

Pin 13 of the Arduino Uno is connected to the built-in LED.

In the Arduino Uno - pins 3,5,6,9,10,11 have PWM capability.

It's important to note that:

- Each pin can provide/sink up to 40 mA max. But the recommended current is 20 mA.

- The absolute max current provided (or sank) from all pins together is 200mA

Courtesy: https://www.circuito.io/blog/arduino-uno-pinout/
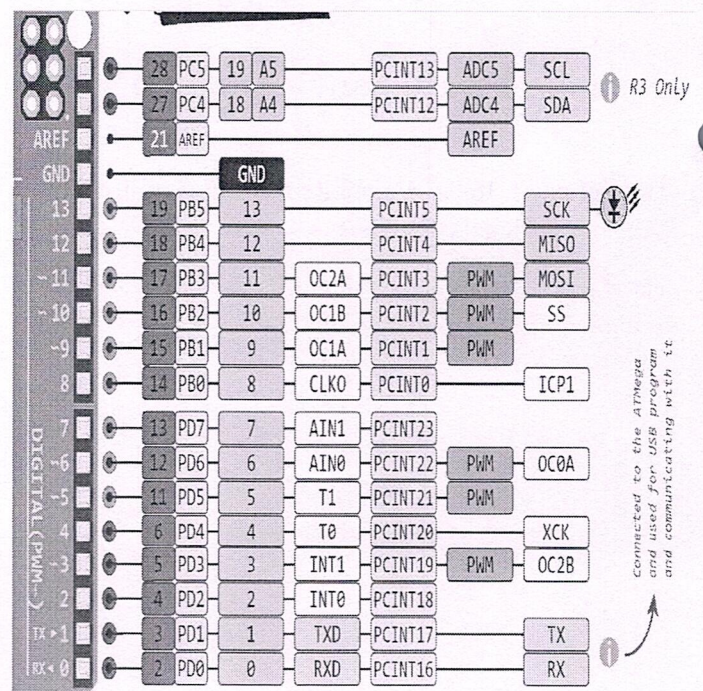
What does digital mean?

Digital is a way of representing voltage in 1 bit: either 0 or 1. Digital pins on the Arduino are pins designed to be configured as inputs or outputs according to the needs of the user. Digital pins are either on or off. When ON they are in a HIGH voltage state of 5V and when OFF they are in a LOW voltage state of 0V.

On the Arduino, When the digital pins are configured as **output**, they are set to 0 or 5 volts.

When the digital pins are configured as **input,** the voltage is supplied from an external device. This voltage can vary between 0-5 volts which is converted into digital representation (0 or 1). To determine this, there are 2 thresholds:

- Below 0.8v - considered as 0.

- Above 2v - considered as 1.

When connecting a component to a digital pin, make sure that the logic levels match. If the voltage is in between the thresholds, the returning value will be undefined.

Aref - Reference voltage for the analog inputs.

Interrupt - INT0 and INT1. Arduino Uno has two external interrupt pins.

External Interrupt - An external interrupt is a system interrupt that occurs when outside interference is present. Interference can come from the user or other hardware devices in the network. Common uses for these interrupts in Arduino are reading the frequency a square wave generated by encoders or waking up the processor upon an external event.

Arduino has two forms of interrupt:

    External
    Pin Change

There are two external interrupt pins on the ATmega168/328 called INT0 and INT1. both INT0 and INT1 are mapped to pins 2 and 3. In contrast, Pin Change interrupts can be activated on any of the pins.

What is PWM?

In general, Pulse Width Modulation (PWM) is a modulation technique used to encode a message into a pulsing signal. A PWM is comprised of two key components: **frequency** and **duty cycle**. The PWM frequency dictates how long it takes to complete a single cycle (period) and how quickly the signal fluctuates from high to low. The duty cycle determines how long a signal stays high out of the total period. Duty cycle is represented in percentage.

PWM signals are used for speed control of DC motors, dimming LEDs and more.

In Arduino, the PWM enabled pins produce a constant frequency of ~ 500Hz, while the duty cycle changes according to the parameters set by the user. See the following illustration:

Courtesy: https://www.circuito.io/blog/arduino-uno-pinout/
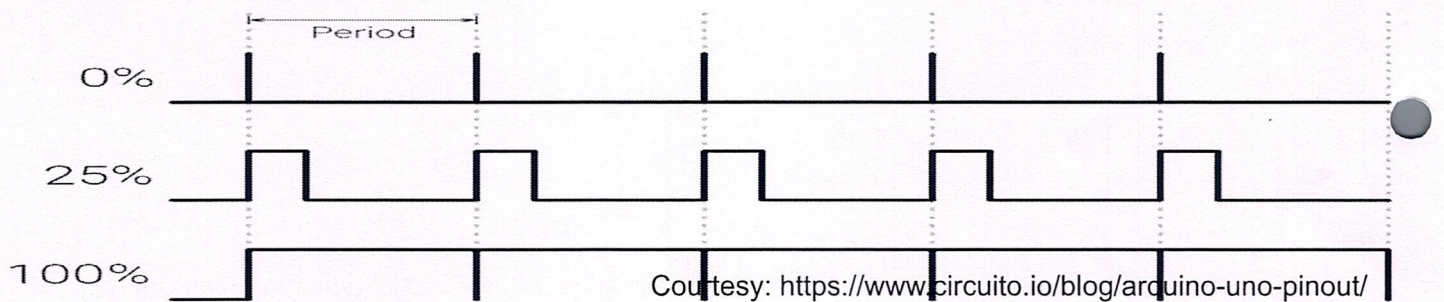
Communication Protocols

Serial (TTL) - Digital pins 0 and 1 are the serial pins of the Arduino Uno.

They are used by the onboard USB module.

Courtesy: https://www.circuito.io/blog/arduino-uno-pinout/

What is Serial Communication?

Serial communication is used to exchange data between the Arduino board and another serial device such as computers, displays, sensors and more. Each Arduino board has at least one serial port. Serial communication occurs on digital pins 0 (RX) and 1 (TX) as well as via USB. Arduino supports serial communication through digital pins with the SoftwareSerial Library as well. This allows the user to connect multiple serial-enabled devices and leave the main serial port available for the USB.

Software serial and hardware serial - Most microcontrollers have hardware designed to communicate with other serial devices. Software serial ports use a pin-change interrupt system to communicate. There is a built-in library for Software Serial communication. Software serial is used by the processor to simulate extra serial ports. The only drawback with software serial is that it requires more processing and cannot support the same high speeds as hardware serial.

What is SPI?

Serial Peripheral Interface (SPI) is a serial data protocol used by microcontrollers to communicate with one or more external devices in a bus like connection. The SPI can also be used to connect 2 microcontrollers. On the SPI bus, there is always one device that is denoted as a Master device and all the rest as Slaves. In most cases, the microcontroller is the Master device. The SS (Slave Select) pin determines which device the Master is currently communicating with.

SPI enabled devices always have the following pins:

> MISO (Master In Slave Out) - A line for sending data to the Master device
> MOSI (Master Out Slave In) - The Master line for sending data to peripheral devices
> SCK (Serial Clock) - A clock signal generated by the Master device to synchronize data transmission.

SPI - SS/SCK/MISO/MOSI pins are the dedicated pins for SPI communication. They can be found on digital pins 10-13 of the Arduino Uno and on the ICSP headers.

What is I2C?

I2C is a communication protocol commonly referred to as the "I2C bus". The I2C protocol was designed to enable communication between components on a single circuit board. With I2C there are 2 wires referred to as SCL and SDA.

> SCL is the clock line which is designed to synchronize data transfers.
> SDA is the line used to transmit data.

Each device on the I2C bus has a unique address, up to 255 devices can be connected on the same bus.

Arduino Uno Pinout - ICSP Header

ICSP stands for In-Circuit Serial Programming.

The name originated from In-System Programming headers (ISP).

Manufacturers like Atmel who work with Arduino have developed their own in-circuit serial programming headers.

These pins enable the user to program the Arduino boards' firmware.

There are six ICSP pins available on the Arduino board that can be hooked to a programmer device via a programming cable.
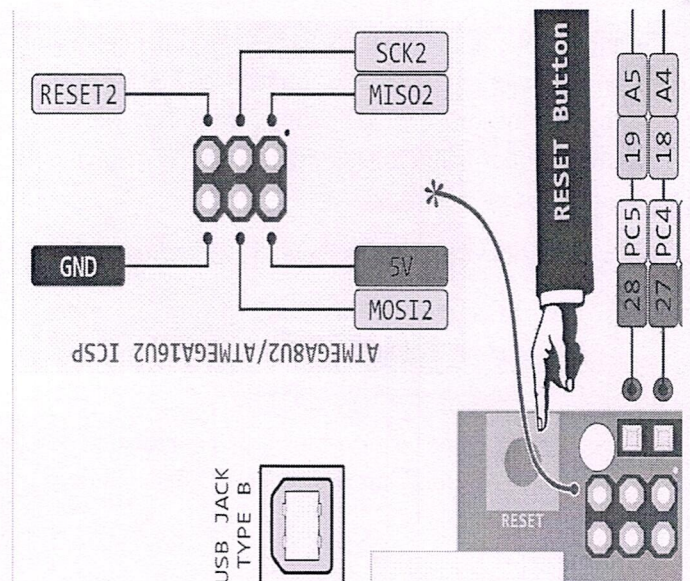
Arduino family

> **Arduino Uno** is a microcontroller board based on the ATmega328P.
> It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator (CSTCE16M0V53-R0), a USB connection, a power jack, an ICSP header and a reset button.
> It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

Courtesy: https://www.arduino.cc/en/main/products

Technical Specifications

MICROCONTROLLER	ATmega328P	FLASH MEMORY	32 KB (ATmega328P) of which 0.5 KB used by bootloader
OPERATING VOLTAGE	5V	SRAM	2 KB (ATmega328P)
INPUT VOLTAGE (RECOMMENDED)	7-12V	EEPROM	1 KB (ATmega328P)
INPUT VOLTAGE (LIMIT)	6-20V	CLOCK SPEED	16 MHz
DIGITAL I/O PINS	14 (of which 6 provide PWM output)	LED_BUILTIN	13
PWM DIGITAL I/O PINS	6	LENGTH	68.6 mm
ANALOG INPUT PINS	6	WIDTH	53.4 mm
DC CURRENT PER I/O PIN	20 mA	WEIGHT	25 g
DC CURRENT FOR 3.3V PIN	50 mA		

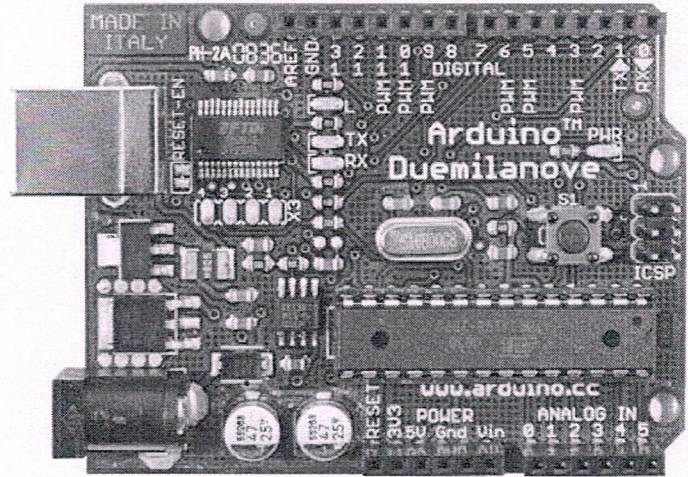Courtesy: https://www.arduino.cc/en/main/products

Arduino Duemilanove:

The Arduino Duemilanove ("2009") is a microcontroller board based on the ATmega168 or ATmega328.

It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button.

It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

"Duemilanove" means 2009 in Italian and is named after the year of its release.

Courtesy: https://www.arduino.cc/en/main/products

Technical Specifications:

Microcontroller	ATmega168
Operating Voltage	5V
Input Voltage (recommended)	7-12V
Input Voltage (limits)	6-20V
Digital I/O Pins	14 (of which 6 provide PWM output)
Analog Input Pins	6
DC Current per I/O Pin	40 mA
DC Current for 3.3V Pin	50 mA
Flash Memory	16 KB (ATmega168) or 32 KB (ATmega328) of which 2 KB used by bootloader
SRAM	1 KB (ATmega168) or 2 KB (ATmega328)
EEPROM	512 bytes (ATmega168) or 1 KB (ATmega328)
Clock Speed	16 MHz

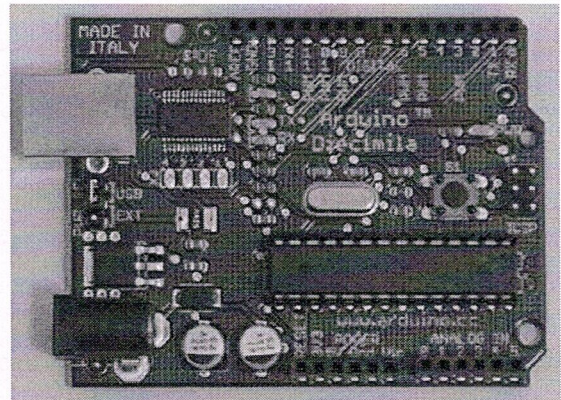Courtesy: https://www.arduino.cc/en/main/products

Arduino Diecimila

The Arduino Diecimila is a microcontroller board based on the ATmega168.

It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button.

It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

"Diecimila" means 10,000 in Italian and was named thusly to mark the fact that over 10,000 Arduino boards have been made.

Courtesy: https://www.arduino.cc/en/main/products

Technical Specifications:

Microcontroller	ATmega168
Operating Voltage	5V
Input Voltage (recommended)	7-12V
Input Voltage (limits)	6-20V
Digital I/O Pins	14 (of which 6 provide PWM output)
Analog Input Pins	6
DC Current per I/O Pin	40 mA
DC Current for 3.3V Pin	50 mA
Flash Memory	16 KB of which 2 KB used by bootloader
SRAM	1 KB
EEPROM	512 bytes
Clock Speed	16 MHz

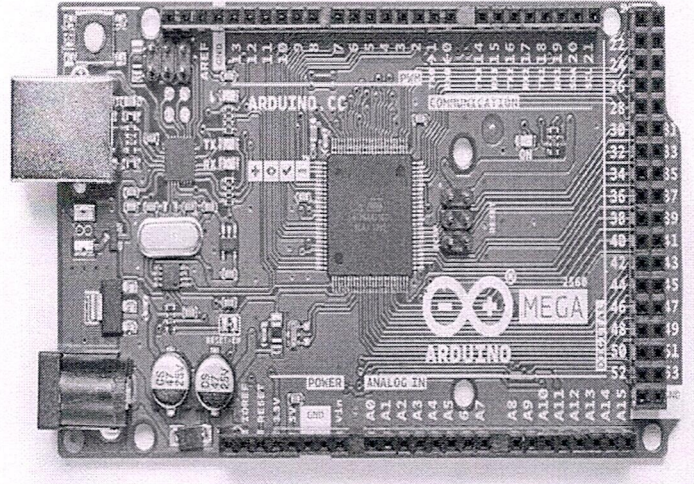Courtesy: https://www.arduino.cc/en/main/products

Arduino Mega 2560 Rev3

The **Arduino Mega 2560** is a microcontroller board based on the ATmega2560.

It has 54 digital input/output pins (of which 15 can be used as PWM outputs), 16 analog inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button.

It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

The Mega 2560 board is compatible with most shields designed for the Uno and the former boards Duemilanove or Diecimila.

Courtesy: https://www.arduino.cc/en/main/products

Technical Specifications

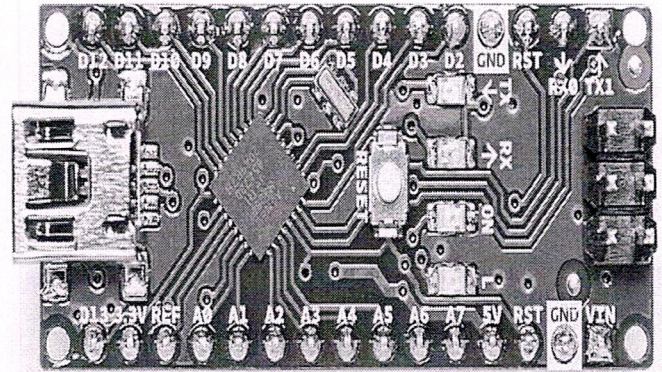|				
MICROCONTROLLER	ATmega2560		FLASH MEMORY	256 KB of which 8 KB used by bootloader
OPERATING VOLTAGE	5V		SRAM	8 KB
INPUT VOLTAGE (RECOMMENDED)	7-12V		EEPROM	4 KB
INPUT VOLTAGE (LIMIT)	6-20V		CLOCK SPEED	16 MHz
DIGITAL I/O PINS	54 (of which 15 provide PWM output)		LED_BUILTIN	13
PWM DIGITAL I/O PINS	15		LENGTH	101.52 mm
ANALOG INPUT PINS	16		WIDTH	53.3 mm
DC CURRENT PER I/O PIN	20 mA		WEIGHT	37 g
DC CURRENT FOR 3.3V PIN	50 mA			

Courtesy: https://www.arduino.cc/en/main/products

Arduino Nano

The Arduino Nano is a small, complete, and breadboard-friendly board based on the ATmega328 (Arduino Nano 3.x).

It has more or less the same functionality of the Arduino Duemilanove, but in a different package.

It lacks only a DC power jack, and works with a Mini-B USB cable instead of a standard one.

Courtesy: https://www.arduino.cc/en/main/products

Technical Specifications

MICROCONTROLLER	ATmega328	FLASH MEMORY	32 KB of which 2 KB used by bootloader
OPERATING VOLTAGE	5V	SRAM	2 KB
INPUT VOLTAGE (RECOMMENDED)	7-12V	EEPROM	1 KB
DIGITAL I/O PINS	22 (of which 6 provide PWM output)	CLOCK SPEED	16 MHz
PWM DIGITAL I/O PINS	6	WEIGHT	7 g
ANALOG INPUT PINS	8		
DC CURRENT PER I/O PIN	40 mA		

Courtesy: https://www.arduino.cc/en/main/products

Arduino Bluetooth

The Arduino BT is a microcontroller board originally was based on the ATmega168, but now is supplied with the 328, and the Bluegiga WT11 bluetooth module.

It supports wireless serial communication over bluetooth (but is not compatible with Bluetooth headsets or other audio devices).


Courtesy: https://www.arduino.cc/en/main/products
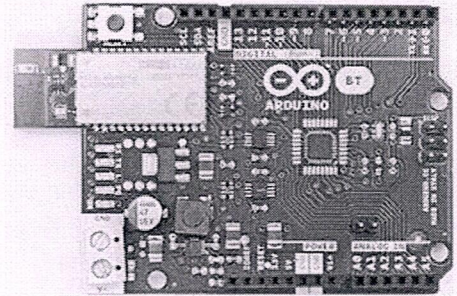
Arduino Lilypad

LilyPad Arduino 04

This revision uses the ATmega328P instead of the ATmega168V. All other details are identical to version 03.

LilyPad Arduino 03

This revision has a 6-pin programming header that's compatible with FTDI USB cables and the Sparkfun FTDI Basic Breakout. It adds support for automatic reset, allowing sketches to be uploaded without pressing the reset button on the board. The header is surface mounted, meaning that the board has no pokey bits sticking out the back.

Courtesy: https://www.arduino.cc/en/main/products
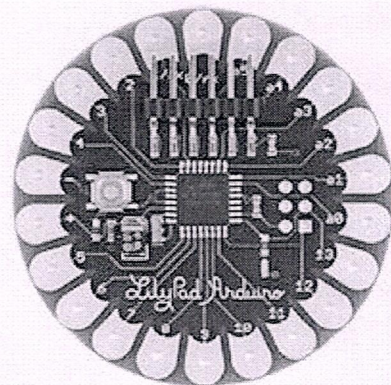
Arduino IDE installation and Setup

Arduino sketch Overview:

Arduino IDE is the open source Integrated Development Environment which is used for uploading programs easily to a variety of Arduino boards, clones, and compatibles.

You can visit the Arduino website at https://www.arduino.cc/